

Revision of the Ant Genus *Rogeria* (Hymenoptera: Formicidae) with Descriptions of the Sting Apparatus

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Abstract.—This is the first complete revision of the century-old ant genus *Rogeria*. The revision recognizes 39 species, of which 19 are new species: *alzatei* n. sp. (Panama, South America, Dominican Republic), *besucheti* n. sp. (Paraguay, Colombia, Peru), *carinata* n. sp. (Caribbean), *ciliosa* n. sp. (Venezuela, Ecuador), *cornuta* n. sp. (Belize, southern Mexico), *cuneola* n. sp. (Mexico, Central America), *gibba* n. sp. (Colombia, Ecuador), *innotabilis* n. sp. (Mexico, Central America), *leptonana* n. sp. (Mexico, Central America, Dominican Republic), *lirata* n. sp. (Trinidad, South America), *megastigmatica* n. sp. (Solomon Islands), *merenbergiana* n. sp. (Colombia, Ecuador), *neilyensis* n. sp. (Costa Rica), *nevadensis* n. sp. (Colombia), *prominula* n. sp. (Brazil), *scobinata* n. sp. (Trinidad, South America), *terescandens* n. sp. (Costa Rica), *tribrocta* n. sp. (Colombia), and *unguispina* n. sp. (Venezuela). Previously recognized species are *belti* Mann 1922, *blanda* Fr. Smith 1858, *bruchi* Santschi 1922, *brunnea* Santschi 1930, *creightoni* Snelling 1973, *curvipubens* Emery 1894, *exsulans* Wilson and Taylor 1967, *foreli* Emery 1894, *germani* Emery 1894, *imernus* Mann 1922, *lacertosa* Kempf 1963, *micromma* Kempf 1961, *minima* Kusnezov 1958, *pellecta* Kempf 1963, *procera* Emery 1896, *scandens* Mann 1922, *sicaria* Kempf 1962b, *stigmatica* Emery 1897, *subarmata* Kempf 1962a, and *tonduzi* Forel 1899. Nine new synonyms are proposed: *caraiha* Santschi 1936, *cubensis* Santschi 1936, *habanica* Santschi 1936, and *scabra* Weber 1934 = *brunnea* Santschi 1930; *gaigei* Forel 1914, and *huachucana* Snelling 1973 = *foreli* Emery 1894, *minensis* Santschi 1923 = *germani* Emery 1894; *sublevinodis* Emery 1914, and *manni* Santschi 1922 = *stigmatica* Emery 1897. Seven new combinations are proposed: *epinotalis* Mann 1919, *rugosa* Mann 1921, *striatella* Mann 1921, *tortuosa* Mann 1921, *tortuosa levifrons* Mann 1921, *tortuosa polita* Mann 1921, and *tortuosa stoneri* Mann 1925 to *Lordomyrma*. Three species occur in Polynesia and Melanesia; the rest are New World: southwestern United States to southern Paraguay. A key to the workers is provided. All species are briefly described and illustrated to show variation. Available biological information is summarized. Six informal species groups are defined for 29 species; possible affiliations of the remaining 10 species are indicated. A new character system, the sting apparatus, is used to help define the species and species-groups. Pilosity also provides an important new set of characters for species identification in this genus.

INTRODUCTION AND DISCUSSION

This revision will redefine the genus, establish new synonymies, create informal species groups, redescribe species, provide a key to the workers, and summarize ecological information. Keys to the reproductives are not included, because queens are known or proposed for less than half of the *Rogeria* species and males for only four species.

The genus *Rogeria* was erected by Emery (1894) for a few neotropical ants then in *Myrmica* and *Tetramorium*. He then extended the distribution of the genus to New Guinea with the addition of *stigmatica* (Emery 1897). Discovery of other neotropical species led Emery (1915) to create the subgenus *Irogeria* for those with a clavate petiole.

This subdivision was attractive, and for a brief period *Irogeria* even enjoyed generic status (Brown 1953), but with a better understanding of the variation in petiole shape within species, the splitting of *Rogeria* along these lines became untenable (Kempf 1965). Meanwhile, Melanesian and Polynesian species were being added to the genus with no discussion of the disjunct distribution of the genus or comparisons of New World and Old World species (Mann 1919, 1921, 1925; Santschi 1922, 1941). Brown (1953) recognized that many of these were actually *Lordomyrma* species, but still, the Pacific species including *stigmatica*, *epinotalis*, and later, *exsulans* remained in *Rogeria*. Wilson and Taylor (1967) called this "...one of the most anomalous discontinuous distributions found in ants."

The disjunct distribution of *Rogeria* was questioned by Kusnezov (1958) on the basis of palpal formula differences between *stigmatica* and a South American species, and by Kugler (1978b) on the basis of the sting apparatus. In contrast to all other myrmicine genera, there were two distinctly different sting apparatuses within the genus, and that difference coincided with the disjunct distribution of the genus. The sting of *inermis* from Central America was strong, acute and with an unusual low dorsal flange; the sting of *stigmatica* from the Pacific had a weak, narrowly spatulate sting shaft and no dorsal flange (among other differences). I believed a revision of *Rogeria* using sting apparatus characters would separate the Pacific and New World species into distinct genera.

The potential of the sting apparatus for defining ant genera and inferring phylogeny has been demonstrated by a number of comparative morphological studies (Kugler 1978b, 1980, 1986, 1992). In addition, Bolton (1973, 1982, 1987) has often used externally visible parts of the sting to help define some myrmicine taxa. But this is the first time that characters from the whole apparatus have been used as an integral part of a taxonomic revision. This work, then, also tests the usefulness of the sting apparatus in the alpha-taxonomy of ants.

I examined sting apparatuses of 79 workers and queens in 27 *Rogeria* species and seven *Lordomyrma* species. In the five species in which both queens and workers were dissected, there were only the usual individual differences, such as numbers of sensilla. Contrary to expectations, the Western Samoan species *exsulans* is unmistakably related to Central American *Rogeria* species in sting apparatus, pygidium, and external anatomy. Moreover, some South American species (*ciliosa*, *gibba*, *besucheti*) had sting apparatuses and pygidia with the same distinctive features of *stigmatica*. It seems the distribution of *Rogeria* really is disjunct.

Sting and pygidial characters provided support for numerous other taxonomic decisions as well. For example, they provided strong support for creating the *stigmatica*-group of species, and could conceivably be used to distinguish that group as a separate genus. Sting apparatus anatomy also supported Brown's (1953) belief that *levifrons*, *striatella*, and *tortuosa* are *Lordomyrma* species. Autapomorphic shape of the sting shaft confirmed

that *germaini* and *lirata* are sister species. The unusual shape of the spiracular plate ultimately convinced me to propose *innotabilis* as a new species after long deliberation over the welter of variation within the *creightoni*-group.

This character system must be used with caution however. The apparatus is prone to reduction and convergence of form. The sting of *Lordomyrma epinotalis* is more like those of the *Rogeria stigmatica*-group than those of *Lordomyrma*. In this case, I based my decision to transfer *epinotalis* to *Lordomyrma* on external characters, since the common sting features could well be due to reduction convergence.

Hair has not been used previously in *Rogeria* systematics, but in this revision I came to rely more and more on characteristics of pilosity for distinguishing species. Consequently it has become necessary for species descriptions to identify precisely the several kinds of hairs and their distributions on the ants, sometimes including the numbers of pairs of erect hairs on the head, mesosoma, and nodes. This means, of course, that care must be taken to not disturb the hair while cleaning and mounting the ants.

I have attempted to take a fairly conservative approach to synonymy and description of new species, choosing in ambiguous situations to err on the side of not changing the number of species in the genus. Thus, for lack of sufficient evidence, some species may actually contain several sibling species: *alzatei*, *beltii*, *creightoni*, *foreli*, *leptonana*, and *scandens*. On the other hand, I have retained some names that may fall when collections improve: *bruchi*, *micromma*. Treatment of the *creightoni*-group has perhaps been somewhat less conservative (See the Species Group section).

All told, this study recognizes 39 species (including 19 new species), establishes nine new synonymies and transfers seven species to *Lordomyrma*. It fails to resurrect the subgenus *Irogera*. It retains three Polynesian/Melanesian species (*stigmatica*, *megastigmatica*, *exsulans*) with the Neotropical bulk of the genus.

As presently constituted, members of the genus *Rogeria* are distributed from Buenos Aires to southern Texas and Arizona, and in the Pacific between 10°N and 25°S from Tahiti to the western end of the island of New Guinea. So far it is unknown in Australia or southeastern United States. Table 1 shows the distribution of species in

Table 1. Geographic distribution of *Rogeria* species. The North American region is from southwestern United States through Panama. The northern region of South America extends from the north and west coasts through the Amazonian basin. The southern region of South America includes Paraguay, adjacent Brazil, and Argentina south to Buenos Aires. Trinidad is the only known Caribbean locality of three species (*blanda*, *lirata*, *scobinata*). A question mark indicates that presumed queens, but no workers, were collected in that region. See text for further discussion.

Species	North America	Caribbean	South America		Pacific
			Northern	Southern	
<i>alzatai</i>	+		+	+	
<i>belti</i>	+		+		
<i>besucheti</i>			+		
<i>blanda</i>	+	+	+		
<i>bruchi</i>				+	
<i>brunnea</i>			+		
<i>carinata</i>			+		
<i>ciliosa</i>	+				
<i>cornuta</i>			+		
<i>creightoni</i>	+				
<i>cuneola</i>					
<i>curvipubens</i>	+	+	+		
<i>exsulans</i>					+
<i>foreli</i>	+	+	+		
<i>germaini</i>				+	
<i>gibba</i>			+		
<i>inermis</i>	+				
<i>innotabilis</i>	+		+		
<i>lacertosa</i>				+	
<i>leptonana</i>	+		+		
<i>lirata</i>		+	+		
<i>metastigmatica</i>					+
<i>merenbergiana</i>			+		
<i>micronoma</i>			+		
<i>minima</i>				+	
<i>neilyensis</i>	+				
<i>nevadensis</i>			+		
<i>pellecta</i>				+	
<i>procera</i>			+		
<i> prominula</i>			+		
<i>scandens</i>	+				
<i>scobinata</i>	+	+	+	+	
<i>sicaria</i>				+	
<i>stigmatica</i>					+
<i>subarmata</i>			+	+	
<i>terescandens</i>	+				
<i>tonduzi</i>	+				
<i>tribrocca</i>			+		
<i>unguispina</i>			+		

more detail. In the North American region, most species occur below the Isthmus of Tehuantepec, but two species (*creightoni*, *cuneola*) extend northward through the eastern lowlands of Mexico. Only *foreli* and *creightoni* have been collected in the United States. The North American region contains 8-10 endemic species (depending on the uncertain distributions of *innotabilis* and *leptonana*); the Caribbean, two endemic species; South America (including Trinidad), 19 endemic species and the Pacific, three endemic species. Only 5-7 species (depending on *innotabilis* and *leptonana*) are found in both Central America and northern South America.

Little is known of the biology of these cryptic ants. Collection records usually range from sea level to 1000m, but five species extend higher and two (*unguispina* and *merenbergiana*) can be found at 2000m. *Rogeria* species are generally collected in moist forests (primary or secondary forests, coffee or cacao plantations), but at higher elevations can be found in pastures (*leptonana*, *merenbergiana*). Several species (*creightoni*, *cuneola*, *foreli*) have been found in both moist and dry climates. *Rogeria foreli* is the most unusual, with some members dwelling at over 1800m in the temperate mountains of southern Arizona.

Most *Rogeria* species have only been collected as strays or by Berlese or Winkler sampling, usually in leaf litter and rotten wood, but occasionally among epiphytes and moss (*belti*, *creightoni*, *exsulans*). Nests of several species (*belti*, *blanda*, *merenbergiana*) have been found under loose bark of rotten logs. Nests of *blanda* and *tonduzi* have been taken from the trunks of cacao trees. A nest of *leptonana* was found at 1750m under a rock in a pasture.

Because nests are so rarely found, males are known for only four species (*belti*, *blanda*, *leptonana* and *stigmatica*), and queens associated through nest series for only nine species (See Synonymic List of Species).

METHODS AND TERMINOLOGY

Dissections

Mouthparts, sting apparatus, pygidium, hypopygium, and male genitalia preparations were obtained by rehydrating ants in 70% ethanol, dissecting these structures from the ants, clearing in

55-60°C lactophenol for 5 minutes (or longer if necessary), rinsing twice in 70% ethanol, and rinsing twice in 95% ethanol. After clearing, sting apparatuses and genitalia were usually cut in half, except for the aedeagus and sting, which were separated from the other sclerites. Stings, pygidia, and hypopygia were mounted in glycerin jelly for ease of repositioning. Mouthparts, genitalia, and other sting apparatus sclerites were soaked in xylene, then mounted in Canada balsam. Occasionally, whole ants were similarly cleared and mounted in balsam. Preparations were examined with a Zeiss KF-2 phase contrast microscope.

The "Materials Examined" sections of each species description identifies which specimens were dissected. Following the locality of the dissected ant, brackets identify the structures slide-mounted ("sting" means sting apparatus, pygidium and hypopygium). Dissected specimens are workers unless otherwise identified.

Pinned vouchers are identified with the label "Kugler 1991 Dissection Voucher." All are deposited in the collection of the MCZ, except for vouchers of *lacertosa*, *pellecta*, *subarmata*, the Agudos, Brazil voucher of *alzatei*, and the Surinam vouchers of *curvipubens*, which are all in the MZSP.

Illustrations

Drawings were made using a grid eyepieces and grid-backed tracing paper. Drawings of sting apparatus preparations were made at 400X with estimated accuracy of ≤ 0.001 mm. Scanning electron micrographs were taken on an AMR-900 and a JEOL JSM-35C.

Dorsal views of heads are in the same full-face view used to measure HL. Lateral views of mesosomas are in the same view used to measure WL, SPL, and MHI.

Drawings attempt to show all hairs on the left side of the body that project well above the body outline. Care was taken to present typical pilosity, rather than matted or damaged hairs. Hair is not included in line drawings of: 1) dorsal views of heads, 2) ventral portions of head profiles, 3) most dorsal views of waists, and 3) queens and males.

All line drawings of sting apparatuses are from workers.

Male genitalia drawings show the lateral view of the aedeagus and medial view of the right paramere and volsella (with associated part of the

phallobase).

Nontype specimens are identified in figure legends by affixing their collection localities in parentheses.

Measurements and Indices

Measurements and drawings of whole ants, except for the very largest, were made using a Zeiss SR stereomicroscope at 125X magnification and a fiber optic ring lamp. Estimated accuracy: $\pm 0.01\text{mm}$.

All specimens were measured for Weber's Length (WL) then at least the largest and smallest from each locality were measured completely. The maximum and minimum of each measurement and index were double-checked, as were all measurements of holotypes. The number of specimens (N) that follows the list of metric characters at the beginning of a species description is the number of ants that were measured *completely*. The numbers at the ends of "Material Examined" sections are *total* specimens studied.

In listing metric characters for new species, the ranges found in all type material are followed by the holotype measurements in parentheses.

If no queens or males are described for a species, none were available for study.

CL	Cephalic index: HW/HL.
EL	Eye length: Maximum diameter of compound eye viewed straight on.
FLW	Frontal lobe width: In full face dorsal view, maximum transverse distance across frontal lobes.
GL	Gaster length: In lateral view, from anterior edge of first tergum to posteriormost point usually T2 or T3, but sometimes to end of pygidium).
GW	Gaster width: Maximum transverse distance across gaster.
HL	Head length: Maximum longitudinal distance from the anterior portion of the clypeus (usually the clypeal apron, but sometimes the more prominent body of the clypeus) to the midpoint of a line across the back of the head.
HW	Head width: Maximum width in same view as for HL, excluding eyes. For males, HW includes compound eyes.
ML	Mandible length: In same view as for HL, from anterior portion of head to apex of closed mandibles.
OI	Ocular index: EL/HW.
PetL	Petiole length: In lateral view and with petiole not strongly flexed up or down, the axial distance from the dorsal corner of the posterior peduncle to the nearest edge of the metapleural lobe.

PetW	Petiole width: Maximum transverse distance across the node.
PpetL	Postpetiole length: In lateral view, the axial distance from base of node in front to tip of posterior peduncle.
PpetW	Postpetiole width: Maximum transverse distance across the postpetiole.
PSI	Petiolar spine index: SpL/WL.
PW	Pronotal width: Maximum width across pronotum in dorsal view.
SI	Scape index: SL/HW.
SL	Scape length: Maximum length excluding basal condyle and neck.
SpL	Propodeal spine length (Fig. 1): In same view as for WL, from tip of propodeal spine to nearest edge of propodeal spiracle peritreme.
MH	Mesosoma height (Fig. 1): In perfect lateral view, the vertical distance from a line tangent to the ventralmost points of the meso- and metasterna to the highest point on the mesosoma profile (for a broadly arching pronotum, estimated as the midpoint of the arc).
MHI	Mesosoma height index (Fig. 1): Mesosoma height (MH) divided by the horizontal distance from the base of the MH line to the posteroventral corner of the propodeum.
TL	Total length: Sum of ML + HL + WL + PetL + PpetL + GL to the nearest 0.1mm.
WL	Weber's length (Fig. 1): In perfect lateral view of the mesosoma, diagonally from posteroventral corner of mesosoma to farthest point on anterior face of pronotum, excluding the neck.

Additional Terminology

Terms such as vertex, occiput, malar and genal areas are of dubious accuracy when applied to ants. Consequently, there is disagreement over how to name the regions of the head (Trager 1989; Snelling 1989; Wheeler 1989). Moreover, these terms are confusing jargon that make the use of keys and descriptions difficult for the uninitiated. Instead, I prefer to rely, as much as possible, on the generally understood directional terms, anterior, lateral, etc., assuming that the mandibles are anterior. Five regions of the head usually contain distinctive sculpture in *Rogeria* (Fig. 1). 1) The **middorsum** of the head is the median portion of the dorsal surface between the maximum retraction of the scapes and extending from the frontal area to a change in sculpture near the rear of the head. 2) The **posterior** (region of the) **head** includes the actual posterior surface of the head and the **posterocephalum**, the dorsal surface between the middorsum and the posterior outline of the head. The "posterior head" seems equivalent to

the "vertex" of some authors who consider the mandibles to be ventral and the back of the head to be the top, rather than posterior. 3) The **laterodorsa** are the portions of the head seen in dorsal view that lie beneath the sweeps of the scapes. 4) The **venter** is the ventral surface of the head not seen in lateral view. 5) The **sides** of the head lie between the venter and the laterodorsa (between the lateral outline of the head in dorsal view and the ventral outline of the head in lateral view).

In **triangular mandibles** the basal angle is distinct and nearly a right angle (e.g. Figs. 43, 49, 63); in **subtriangular mandibles** the basal angle is reduced and more obtuse (e.g. Figs. 14, 58, 61). Sometimes tiny **denticles** are intercalated between or replace teeth (e.g. Figs. 35, 55); these are not included in tooth counts. The **palpal formula** is the number of maxillary palpomeres followed by number of labial palpomeres. Palpal formula is usually determined by dissection, thus the sample size is very small and may not show the variation within the species. The **body of the clypeus** is the medial portion of the clypeus anterior to the frontal lobes and dorsal to the **clypeal apron**, which is the anterior rim just above the mandibles (Fig. 1). Clypeal apron shape is described as seen from dorsal view. In describing eye shape, **elliptical** or **ellipsoid** means similarly rounded at both ends, whereas **oval** or **ovoid** means the anterior end is more narrowly rounded. The shape of the **posterior outline of the head** is as seen in the full dorsal view used for measuring HL since shape sometimes varies with the pitch of the head. The **nuchal grooves** are longitudinal impressions in the posteroventral corners of the head, into which the lower corners of the pronotum fit when the head is retracted.

A rough index of the degree of inclination of the propodeal spines is expressed by imagining a **bisecting line** that divides the lateral aspect of the spine in half and extends forward over the mesosoma side, and noting where it intersects the edge of the mesopleuron or pronotum (Fig. 1). It is important that the mesosoma be in perfect lateral view. The **diameter of a propodeal spiracle** includes the peritreme and is as seen in full lateral view of the mesosoma. The spiracle's position is measured from the outer edge of the peritreme to the nearest edge of the propodeum, which is the free edge of the infradental lamella.

The most common shapes of postpetioles as

seen from dorsal view are **subrectangular**, which have evenly convex sides that are widest midlength (e.g. Figs. 53, 58), and **subtrapezoidal**, which have convex sides that diverge caudad (e.g. Figs. 49, 50, 51).

The terga and sterna of the gaster are referred to by abbreviations **T1**, **S1**, etc. **Terminal segments of gaster rotated ventrad** means that T2 and T3 are distinctly longer than their corresponding sterna, causing the pygidium and hypopygium (T4 and S4) to shift anteroventrad and making T2 or T3 the distalmost sclerite of the gaster. Figs. 28, 40, 43, and 63 show rotated terminal segments; Figs. 2, 5, and 8 show unrotated segments.

Pygidial gland sculpture refers to a pair of microareolate patches on the anterior edge of the pygidium. The presence of this characteristic sculpture strongly suggests the presence of pygidial glands, but its absence does not necessarily mean the glands are absent (Hölldobler, et al. 1976; Kugler 1978a; Hölldobler and Engel 1978). In most species I was able to see the gland reservoirs attached to these patches, but failure to see the reservoirs does not mean they are absent; they could easily be lost during dissection.

Sting apparatus terms are identified in Figures 3 and 42.

Sculpture descriptions follow illustrations and definitions of Harris (1979). It seems to me that the term "**areolate**" in Harris' nomenclature best describes much of the sculpture in *Rogeria*, but I suspect many would prefer the term "**reticulate**." I have called the ridges on the head and mesosoma of many species "**rugae**," because they are irregular, and wrinkled to varying degrees, but others may prefer to call them "**carinae**." Also following Harris, in compound descriptors, such as **rugose-areolate**, the predominant type of sculpture is first.

The following are used to describe approximate hair inclination as seen in side view (Fig. 1): **erect** ($> 70^\circ$), **suberect** (70° - 50°), **subdecumbent** (50° - 25°), **decumbent** (25° - 5°), **appressed** ($< 5^\circ$) (inference from Wilson 1955). To arrive at the **numbers of erect hairs** on the mesosoma dorsum, I used both dark and light backgrounds and a variety of positions to count all erect hairs on one half of the dorsum from the anterior edge of the pronotal disc to the bases of the propodeal spines. Since the hairs are distributed symmetrically, that count gives the number of pairs of erect hairs. Frequently,

both sides were counted in order to check for the presence of broken hairs. **Erect hair on head dorsum** means on frontal lobes, middorsum, and posterior head, but not under the sweep of the scapes. **Erect hair on scapes** means on the dorsal or anterior surfaces. Usually no attempt is made to describe hair on ventral and lateral aspects of body, nor on other than extensor surfaces of femora and tibiae.

DEPOSITORIES

ANIC	Australian National Insect Collection, CSIRO, Canberra, Australia.
BMNH	British Museum (Natural History), London, U.K.
CKC	Charles Kugler Collection, Radford University, Radford, VA, U.S.A.
CUIC	Cornell University Insect Collection, Ithaca, NY, U.S.A.
DMOC	David M. Olson Collection, University of California, Davis, CA, U.S.A.
FML	Fundación Miguel Lillo, Instituto de Zoología, Miguel Lillo 251, Tucumán, Argentina.
JTLC	John T. Longino Collection
LACM	Los Angeles County Museum, Los Angeles, CA, U.S.A.
MCSN	Museo Civico di Storia Naturale "Giacomo Doria," Genoa, Italy.
MCZ	Museum of Comparative Zoology, Cambridge, MA, U.S.A.
MHN	Museum d'Histoire Naturelle, Geneva, Switzerland.
MIZA	Museo Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay, Venezuela.
MZSP	Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
NMB	Naturhistorisches Museum, Basel, Switzerland.
PSWC	Philip S. Ward Collection, University of California, Davis, CA, U.S.A.
USNM	United States National Museum, Washington, D.C., U.S.A.

Genus ROGERIA Emery

Myrmica (in part); Fr. Smith 1858:131. Type: *Formica rubra* Linneaus, 1758, designation of Wheeler, 1911.

Tetramorium (in part); Mayr 1886:359. Type: *Formica caespitum* Linneaus, 1758.

Rogeria Emery 1894:188. Type: *Rogeria curvipubens* Emery, 1894, by designation of Wheeler, 1911.

Rogeria subgenus *Irogeria* Emery 1915:191. Type: *Rogeria proceria* Emery, by original designation.

Macromischa (in part); Mann 1922:30. Type: *Macromischa purpura* Roger 1863, by designation of Wheeler, 1911.

Irogeria; Brown 1953:4.

Irogeria; Kempf 1962a:435. [Redescribed].

Rogeria; Kempf 1963:195. [Key to South American species].

Irogeria; Kempf 1964:66. [Key to species].

Rogeria; Kempf 1965:185.

Rogeria; Kempf 1972:227. [Catalog of New World species].

Worker Diagnosis.—Monomorphic myrmicinae. Antenna 12-segmented; scape not reaching posterior margin of head; distinct 3-segmented club longer than rest of funiculus; apical antennomere longer than combined lengths of other two club segments. No antennal scrobes or fossae. Clypeus projects narrowly between frontal lobes at least to posterior edge of antennal insertions. Body of clypeus with one or more pair of longitudinal carinulae. Lateral clypeus not raised into a ridge in front of antennal insertions. Nuchal grooves present on posteroventral corners of head. Anteroventral corners of pronotum angular to dentate and fitting into nuchal grooves. Propodeal spiracle 3 diameters or less from the edge of the propodeum below the propodeal spines. Metapleural lobes not sharply pointed.

Worker Description.—Mandibles usually triangular. Except in some *ciliosa* and *foreli*, mandibles with 5-7 teeth (3 apical teeth decreasing in size basad, followed by 2-3 smaller basal teeth). Additional denticles may occur among basal teeth or any basal tooth may be replaced by a pair of denticles. Palpal formula usually 3,2 or 2,2, but 3,3 in some *stigmatica*-group, and 2,1 in the very tiny *minima*. Scape neither elbowed nor ridged at the base, nor with an apron around the peduncle. Clypeus in profile usually with a very narrow anterior apron. Body of clypeus rises near vertically in most species, but occasionally projecting beyond the clypeal apron. Frontal lobes narrow, but covering antennal insertions; at most feebly notched behind. Frontal triangle small, depressed slightly. Eyes with 1-100 facets; located on sides, in the anterior half of the head (excluding mandibles). Sides of head widest just behind the eyes, forming rounded corners with the posterior head, which is weakly concave to weakly convex in full face view.

Mesosoma generally compact, broad shouldered. Anterior face of pronotum rises nearly vertically from the neck and usually forms a distinct, rounded angle with the dorsal surface. Mesosoma

dorsum without sutures; no mesonotal groove; metanotal groove absent to distinct. Anterior edge of propodeum often marked by a transverse carina. Propodeal spines absent to long. Metapleural lobes low carinae to rounded triangular. Legs not incrassate. No tibial spurs on middle or hind legs. Tarsal claws simple.

Petiolar peduncle with or without a ventral keel; inferior process dentate except in *stigmatica* group. Node unarmed; poorly to well differentiated from peduncle. Postpetiole with short peduncles and a low node that is broader than long. Terminal segments of gaster rotated ventrad in all but the *stigmatica* group.

All pygidia dissected have a pair of small pygidial gland reservoirs and/or paired microareolate patches present on anterior edge, except in the *stigmatica* group. Common features of the sting apparatus are: 1) medial connection of spiracular plate incompletely sclerotized, 2) gonostylus single-segmented, 3) dorsoterminal chaeta present, 4) at least one companion seta (except *gibba*), 5) each lancet with a single moderate to large valve, 6) sting bulb large, with arched sting base.

Mandibles usually predominantly smooth, with piligerous punctures and vestigial carinulae at insertions, but carinulae stronger and more extensive in some members of the *stigmatica*-group. In all but *ciliosa*, the body of the clypeus is smooth with a pair of carinulae extending from the frontal lobes and stopping short of the clypeal apron; these are sometimes accompanied laterally by 1-2 shorter, weaker carinulae. Lateral extremities of clypeus and adjacent cheeks with longitudinal carinulae. Frontal triangle smooth, except in *ciliosa*. If macrosculpture present, frontal lobes and middorsum with diverging longitudinal rugae; rest of body areolate, rugose, or occasionally carinate. Microsculpture when present usually microareolate, appearing granular or punctured at lower magnifications. Posterior face of propodeum smooth, except in *gibba*. Legs smooth and shiny. First segment of gaster smooth and shiny; less so in *prominula*, and *minima*. Pygidium and sometimes other terminal terga with microscopic areolate sculpture on exposed posterior surfaces; pygidium may also possess minute piligerous tubercles.

Short appressed or decumbent pilosity common, most dependably on legs (except *blanda* and

procera) and antennae. Terminal segments of gaster with erect hair. No erect hair on laterodorsa of head (under sweep of scapes). Body of clypeus just above apron with pairs of erect hairs; members of *stigmatica* group each with an additional median hair.

Color from brownish yellow to black, with mandibles, antennae, and legs lighter. Most species also with a lighter triangle on clypeus, cheeks, and frontal area.

Malpighian tubules in the one species examined (*belti*) 5 in the worker (N=2); 5 to 6 in the male (N=3) (Brown 1988).

Wings.—Notation (Fig. 30) follows Brown and Nutting (1949) and Hölldobler and Wilson (1990:9). First and second radial crossveins of primitive formicid wings are lost, creating a single large submarginal cell. The distal portion of the radial sector vein (Rsf4+5) vein is straight or curves forward, but never reaches the edge of the wing. The r-m crossvein present (Fig. 30) or absent (Fig. 37). Median and cubital veins of variable length, but not reaching wing margins. Medio-cubital crossvein always present in females, but may be lost in males.

Larvae.—Similarities among the larvae of *belti*, *scandens*, *procera* and *blanda* found by Wheeler and Wheeler (1973, 1976, 1986, 1988) are summarized here. Form pheidoloid, i.e. "abdomen short, stout and straight; head ventral near anterior end, mounted on short stout neck, which is the prothorax; ends rounded, one end more so than the other" (Wheeler and Wheeler 1976:8). Thorax and abdomen with at least bifid and anchor-tipped hairs; bifid hair on head (sometimes others). Cranium subtrapezoidal; clypeus bulging; antennae with 3 sensilla; labrum bilobed and narrowed dorsally. Mandibles ectatommoid (stout, gradually tapered and curved, with an apical tooth and additional teeth and denticles in some species). Maxilla shape paraboloid or lobose, with cylindrical galea and palps of varying length. Labium narrow; palps only slight elevations. Maxillae and labial surfaces coarsely spinose.

COMPARISONS WITH SIMILAR GENERA

Some members of *Leptothorax* (placed with *Rogeria* in the Leptothoracini) have antennae like *Rogeria* and some have a narrow posterior lobe of the clypeus, but these have rounded anteroventral

corners of the pronotum and no nuchal grooves. Of 65 species of *Leptocephalus* examined at the MCZ, only one had an angular inferior corner of the pronotum, but in that species the scapes extend beyond the head, the posterior lobe of the clypeus is wider, and nuchal grooves are absent.

Some species of *Lordomyrma* (Myrmecinini), a genus sometimes confused with *Rogeria* in Pacific islands, have similar antennal and clypeal features, but have a rounded anteroventral corner of the pronotum and lack nuchal grooves. The stings of *Rogeria* species are dramatically different from those of five *Lordomyrma* species I have examined (*caledonica* Emr André, *levifrons* Mann, *punctiventris* Wheeler, *striatella* Mann, *tortuosa* Mann) in shape of quadrate plate, oblong plate, gonostylus, triangular plate and sting. Another species, *L. epinotalis* is very different from the other *Lordomyrma* I examined and has a sting apparatus somewhat like that of *Rogeria besucheti* or *R. ciliosa*, but lacks the pronotal corner or nuchal grooves of *Rogeria*. Wings of three *Lordomyrma* species I have been able to examine (*epinotalis*, *striatella*, *leae* Wheeler) are distinct from the known *Rogeria* wings in having the Rsf4+5 vein curve anteriorly to the wing margin. In *L. caledonica* this vein is like *Rogeria* in failing to reach the margin, but the m-cu vein is absent. The larvae of an unidentified *Lordomyrma* species differs from the known larvae of *Rogeria* as follows: form pogonomyrmecoid, cranium subelliptical, hairs fewer, none anchor-tipped (Wheeler and Wheeler 1977).

Stenamma (Pheidolini) workers are similar in form of clypeus, including narrow posterior portion between frontal lobes, and some have 3-segmented antennal clubs, but in that case the apical segment is shorter than the combined length of the other two segments. Also, *Stenamma* has no nuchal grooves, the anteroventral corner of the pronotum is rounded, and the metanotal groove is generally more distinct than in *Rogeria* species. Larvae of *Stenamma* differ from those of *Rogeria* as follows: form aphaenogastroid; cranium subhexagonal; mandibles pogonomyrmecoid (similar to ectatommoid); body hairs bifid or denticulate, not anchor-tipped (Wheeler and Wheeler 1953, 1976).

Synonymic List of Species

Castes that have been collected are recorded in brackets in the right column. W = worker, Q = queen, M = male. Upper case Q and M are used if at least some reproductives are associated through a nest series. Lower case q and m are used if no reproductives are linked to workers by a nest series. An asterisk (*) is added if reproductives were not even found in the same localities as workers.

<i>alzatei</i> n. sp.	[W, q]
<i>belti</i> Mann, 1922	[W, Q, M]
<i>besucheti</i> n. sp.	[W]
<i>blanda</i> Fr. Smith, 1858	[W, Q, M]
= <i>foveata</i> Kempf, 1964 (synonymy by Kempf 1965)	
<i>bruchi</i> Santschi, 1922	[W]
<i>brunnea</i> Santschi, 1930	[W, q]
= <i>caraiba</i> Santschi, 1936 n. syn.	
= <i>cubensis</i> Santschi, 1936 n. syn.	
= <i>habanica</i> Santschi, 1936 n. syn.	
= <i>scabra</i> Weber, 1934 n. syn.	
<i>carmata</i> n. sp.	[W]
<i>ciliosa</i> n. sp.	[W, Q]
<i>cornuta</i> n. sp.	[W]
<i>creightoni</i> Snelling, 1973	[W, q*]
<i>cuneola</i> n. sp.	[W, q]
<i>curvipubens</i> Emery, 1894	[W, Q]
<i>exsulans</i> Wilson and Taylor, 1967	[W]
<i>foreli</i> Emery, 1894	[W, Q]
= <i>gagat</i> Forel, 1914 n. syn.	
= <i>huachucana</i> Snelling, 1973 n. syn.	
<i>germani</i> Emery, 1894	[W, q*]
= <i>minensis</i> Santschi, 1923 n. syn.	
<i>gibba</i> n. sp.	[W, q]
<i>inermis</i> Mann, 1922	[W, Q]
<i>innotabilis</i> n. sp.	[W, q*]
<i>lacertosa</i> Kempf, 1963	[W]
<i>leptonana</i> n. sp.	[W, q*, M]
<i>lirata</i> n. sp.	[W, q*]
<i>megastigmatica</i> n. sp.	[W]
<i>merenbergiana</i> n. sp.	[W, Q]
<i>micromma</i> Kempf, 1961	[W]
<i>minima</i> Kusnezov, 1958	[Q]
<i>neilyensis</i> n. sp.	[W]
<i>nevadensis</i> n. sp.	[W]
<i>pellecta</i> Kempf, 1963	[W]
<i>procera</i> Emery, 1896	[W]
= <i>brasiliensis</i> Borgmeier, 1953 (Synonymy by Kempf 1962a)	
<i>prominula</i> n. sp.	[W]
<i>scandens</i> Mann, 1922	[W, Q]
<i>scobinata</i> n. sp.	[W, q]
<i>sicaria</i> Kempf, 1962b	[W]
<i>stigmatica</i> Emery, 1897	[W, Q, M]
= <i>stibolevmodis</i> Emery, 1914 n. syn.	
= <i>manni</i> Santschi, 1922 n. syn.	

<i>subarmata</i> Kempf, 1962a	[W]
<i>terescandens</i> n. sp.	[W]
<i>tonduzi</i> Forel, 1899	[W]
<i>tribrocca</i> n. sp.	[W]
<i>unguispina</i> n. sp.	[W]

Names Transferred to Other Genera.

<i>azumai</i> Santschi 1941 (to <i>Lordomyrma</i> , Brown 1952)
<i>epinotalis</i> Mann 1919 to <i>Lordomyrma</i> , n. comb.
<i>rugosa</i> Mann 1921 to <i>Lordomyrma</i> , n. comb.
<i>tortuosa</i> Mann 1921 to <i>Lordomyrma</i> , n. comb.
<i>tortuosa levifrons</i> Mann 1921 to <i>Lordomyrma</i> , n. comb.
<i>tortuosa polita</i> Mann 1921 to <i>Lordomyrma</i> , n. comb.
<i>tortuosa stoneri</i> Mann 1925 to <i>Lordomyrma</i> , n. comb.
<i>striatella</i> Mann 1921 to <i>Lordomyrma</i> , n. comb.

SPECIES GROUPS

Some species of *Rogeria* can be assembled into more or less distinct species groups. Others can not be placed easily in any group, or seem to link several groups. These *incertae sedis* species are described with the group to which they may be most related.

The *stigmatica*-group may be distinct enough to be treated as a separate genus, but for now seems tied to the rest of *Rogeria* through *blanda*.

In the *creightoni* species group, extensive variation and often limited and scattered collections made it difficult to ascertain which specimens were simple variants and which were distinct species. At one time or another, I considered recognizing between four and 20 species in this group. Ultimately, I tried to steer a middle course between these extremes; neither masking the variation by describing large conglomerate species, nor encumbering the genus with a lot of dubious new species names. As a result, I have been somewhat more venturesome about naming new species in this group, yet there remain a number of rather heterogeneous species (*alzatei*, *brunnea*, *creightoni*, *leptonana*). I have described and illustrated some of the variants in these heterogeneous species in order to alert other taxonomists to remaining species problems and the need for extensive collecting, especially in the Caribbean Islands and circumcaribbean countries.

In the diagnoses below, if a species is listed as undissected, the palpal formula, pygidium, and sting apparatus characters are unknown.

stigmatica-group: *besucheti*, *ciliosa*, *gibba*, *megastigmatica*, *prominula*, *stigmatica*.

Diagnosis.—(*prominula* and *megastigmatica* not dissected). WL 0.67-1.30mm. Palpal formula 3,3 or 3,2. Eye with 4-41 facets. Metanotal groove distinct and extends down sides of mesosoma. Petiolar peduncle without a keel and inferior process a small step or absent. Nodes and gaster wide. Gaster with terminal segments not rotated ventrad, or only slightly rotated (*besucheti*). No pygidial gland sculpture or any evidence of reservoirs. Sting apparatus: weakly sclerotized, spiracle occupying more than 1/4 of spiracular plate; no anal plate; valve chamber not arising abruptly from base of sting shaft; sting shaft and lancets weak, spatulate (except perhaps for *prominula*); sting shaft apex without any flange; furcula a simple arch (no dorsal arm). Predominantly dense areolate macrosculpture on head (except middorsum), mesosoma (except some *stigmatica*), and nodes. Mandibles with piligerous punctures and stronger, more extensive carinulate sculpture than in other *Rogeria* species. No microsculpture on most of body. Body of clypeus with a median erect hair low near anterior margin.

Similar *incertae sedis* species: *blanda*. This species has sculpture and pilosity like *ciliosa* and *gibba*, but has a 2,2 palpal formula, weak metanotal groove, dentate inferior petiolar process, and gaster, pygidium and sting apparatus typical of other groups.

scandens-group: *scandens*, *subarmata*, *terescandens*

Diagnosis.—(*terescandens* not dissected). WL 0.78-1.17mm. Palpal formula 3,2 Eyes large (30-80 facets). Propodeal spiracle faces strongly caudad. Metapleural lobes prominent, triangular. Petiolar node low, anterior face indistinct from peduncle (except some *subarmata*). Inferior petiolar process dentate. Postpetiolar sternum large. Pygidial gland sculpture and reservoirs present, at least in *subarmata*. Sting apparatus like that of *incermis* (Fig. 42). Head, mesosoma, and nodes predominantly rugose; sides of head below eye smooth. Dorsa of head, mesosoma nodes, and gaster T1 with sparse, stiff, untapered, erect hairs and sparse, inconspicuous appressed pilosity (occasional decumbent hairs in some *subarmata*). Scapes and legs with appressed hair only.

Similar *incertae sedis* species: *procera*, *tonduzi*. These both lack the stiff hairs and inflated postpetiole that make the group so distinctive, but otherwise are so similar that perhaps they should be included.

germaini-group: *germaini*, *lirata*, *lacertosa*.

Diagnosis.—WL 0.65-1.05mm, usually > 0.80 mm. Mandibles triangular. Palpal formula 3,2. Body of clypeus not projecting over apron. Eye small (6-20 facets; OI 0.09-0.14). Propodeal spines rather long (PSI 0.18-0.23); directed caudad. Petiole with prominent keel and dentate inferior process. Petiolar node rises abruptly from anterior peduncle and with more or less distinct anterior, dorsal and posterior surfaces. Posterior two-thirds of postpetiolar node with parallel or slightly convergent sides. Postpetiolar sternum in side view rather long, its anterior corner perpendicular. Pygidial gland sculpture and reservoirs present. Sting apparatus similar to that of *inermis*, but sting shaft and lancets weak; lancet lacks barbule. Laterodorsa, sides, and posterior head rugose-areolate (sometimes effaced on sides). Mesosoma predominantly rugose or vermiculate-rugose. Microsculpture weak; intervals on head and mesosoma shiny and nearly smooth. Mesosoma dorsum and gaster T1 with abundant fine, tapered, erect-suberect hairs, but very little, if any, decumbent or appressed pilosity.

Similar *incertae sedis* species: *pellecta*, *sicaria* (*sicaria* not dissected). These have different petiole shapes and more decumbent hair on the mesosoma. *Rogeria sicaria* also differs in clypeus, propodeal spines, and erect pilosity.

creightoni-group: *alzatei*, *brunnea*, *carinata*, *creightoni*, *innotabilis*, *leptonana*, *merenbergiana*, *nevadensis*, *scobinata*, *tribrocca*, *unguispina*

Diagnosis.—(*brunnea*, *nevadensis*, and *tribrocca* not dissected). WL 0.51-0.93mm. Mandibles triangular, except as noted. Palpal formula 3,2 or 2,2. Eyes small (6-19 facets). Petiole with a distinct node and dentate inferior process. Pygidial gland sculpture and reservoirs present. Sting apparatus like that of *inermis* unless otherwise noted. Mesosoma predominantly rugose or carinate. Head dorsum, mesosoma, nodes, and gaster covered with two distinct kinds of hairs: 1) abundant

short, decumbent pilosity and 2) equally or less abundant longer, erect-suberect hair (except for lack of erect hair on head of some *scobinata*). Usually more than 10 pairs on mesosoma dorsum (9 in some *leptonana*, 8 in *carinata*) and 2 or more posterodorsally projecting hairs on each node. All hairs tapered.

Similar *incertae sedis* species: *inermis*, *belti*, *cornuta*, *neilyensis*, *exsulans* (*cornuta* and *neilyensis* not dissected). These do not have two distinct types of hair on the mesosoma dorsum.

curvipubens-group: *cuneola*, *curvipubens*

Diagnosis.—WL 0.50-0.63mm. Mandibles triangular. Palpal formula 2,2. Clypeal apron usually convex (medially flattened in Haitian *curvipubens*). Eye small (4-11 facets). PSI 0.13-0.18. Petiole with distinct node, weak keel, and dentate inferior process. Postpetiole from above usually as in Fig. 74. Pygidial gland sculpture and reservoirs present. Sting apparatus as in *inermis* (Fig. 42), except for sting shaft and lancets of *curvipubens*. Median head and cheeks with weak longitudinal rugose-areolate macrosculpture. Mesosoma with predominantly rugose macrosculpture and areolate microsculpture, both often weak. Body covered with appressed-decumbent pilosity. Erect hairs sparse: none on scapes or extensor surfaces of legs, 0-16 on head (if present, short and limited to posterior head), usually 2-7 pairs on mesosoma dorsum (rarely 8), 0-1 pair posterodorsally projecting and 0-1 laterally projecting hairs on each node. Anterior portions of gaster T1 often lack erect hair. All hairs tapered.

Similar *incertae sedis* species: *micromma*, *minima* (neither dissected). *Rogeria micromma* has a subrectangular postpetiole in dorsal view and abundant erect hair on head. *Rogeria minima* has stiff, cuneate hairs and a 2,1 palpal formula.

foreli-group: *bruchi*, *foreli*

Diagnosis.—WL 0.50-0.80mm, usually < 0.75 mm. Mandibles triangular. Palpal formula 2,2. Eye 5-20 facets. Propodeal spines wide at base. Petiole with distinct node and dentate inferior process. Pygidial gland sculpture and reservoirs present. Sting apparatus almost identical to that of *inermis* (Fig. 42). Sculpture predominantly microareolate on head, mesosoma, and waist;

macrosculpture feeble and limited to head. Most of body with short, appressed-decumbent pilosity only. Erect-suberect hairs present on mandibles,

clypeus, ventral head, coxae, trochanters, sterna of gaster, and terminal terga of gaster.

KEY TO WORKERS OF ROGERIA

1 Pilosity appressed on mesosoma dorsum and gaster T1. A very small number of short decumbent hairs may also be present 2

1' Erect, suberect, or subdecumbent hairs present on mesosoma or gaster T1, often in addition to appressed or decumbent pilosity 4

2(1) Body of clypeus strongly projecting over apron. Basal angle of mandibles very reduced. (amazonian Brazil) (Fig. 14) *prominula*

2' Body of clypeus at most projecting only slightly over apron. Mandibles triangular 3

3(2') Clypeal apron emarginate. Mandible with 5 teeth. (Paraguay, Argentina) (Fig. 82) *bruchi*

3' Clypeal apron convex, often with faint median angle. Mandible with 6-7 teeth. (Caribbean, southwestern United States through northern South America) (Figs. 79-81, 104-105) *foreli*

4(1') Very dense, flexuous, erect hairs on dorsa of head, mesosoma and gaster; no decumbent or appressed pilosity. Promesonotum uniformly and densely areolate 5

4' Erect hair not so dense or flexuous. Decumbent hair present. Promesonotum may have some rugae or carinae 7

5(4). Metanotum forms an abrupt declivity between promesonotum and propodeum. (lowland Colombia, Ecuador) (Figs. 5-6) *gibba*

5' Shallow metanotal groove hardly interrupts mesosoma profile 6

6(5') Petiolar node relatively short and tall. Gaster larger (GW/WL 0.94-0.97). (lowland Ecuador, Venezuela) (Figs. 2-4) *ciliosa*

6' Petiolar node relatively long and low. Gaster smaller (GW/WL 0.63-0.70). (Central and South America) (Figs. 83-84) *blanda*

7(4'). Ventral process of petiolar peduncle reduced to a small step in petiolar profile, or absent 8

7' Ventral process of petiolar peduncle dentate 10

8(7) Propodeal spines longer (PSI 0.17-0.20). Ventral process of petiolar peduncle present as a small step. (Paraguay, Peru, Colombia) (Figs. 15-16) *besucheti*

8' Propodeal spines shorter (PSI 0.07-0.13). Petiolar peduncle lacking a ventral process 9

9(8') WL 0.72-0.92mm. (Pacific Islands) (Figs. 7-12) *stigmatica*

9' WL 1.18-1.30mm. (Solomon Islands) (Fig. 13) *megastigmatica*

10(7') WL 1.28-1.53mm. Eye large (80-100 facets). Postpetiole with an inconspicuous sternum. (Guyana, amazonian Brazil) (Fig. 18) *procera*

10' WL and eyes usually much smaller. If WL and eyes nearly as large, then postpetiolar sternum conspicuous 11

11(10') Sparse, stiff, erect-suberect hairs and short appressed hairs on dorsa of head, mesosoma, waist, and gaster T1. WL > 0.72mm. Eye with > 25 facets 12

11' Erect hairs more curved and tapered; shorter pilosity, if present, usually decumbent. If some erect hairs are stiff, then WL and eye are smaller 14

12(11) Propodeal spines very short (PSI 0.09-0.12). Pygidium with a pair of median tubercles just above the sting. (eastern Brazil) (Figs. 22-23) *subarmata*

12' Propodeal spines longer (PSI > 0.15). Pygidial tubercles lacking 13

13(12') Macrosculpture vestigial or absent on lateral pronotum and petiolar node. Waist slender (PpetW/PpetL 1.08-1.16). (Costa Rica) (Fig. 21) *terescandens*

13' Lateral pronotum with distinct rugae, petiolar node strongly rugose to areolate-rugose. Waist inflated (PpetW/PpetL 1.38-1.61). (Central America) (Figs. 19-20) *scandens*

14(11') Petiole clavate. Eye with 39-48 facets. (Central America) (Figs. 85-86) *tonduzi*

14' Petiole with a distinct node and/or smaller eyes 15

15(14') Undamaged hair on mesosoma dorsum mostly erect to suberect. Decumbent hairs, if present, much less abundant than longer, more erect pilosity 16

15' Mesosoma dorsum with abundant appressed or decumbent pilosity, usually in addition to longer erect to suberect hair 21

16(15) EL/SpL > 1.00. Gaster T1 usually lacks decumbent and appressed pilosity (occasionally 1 or 2 decumbent hairs present). (Central America) (Figs. 40-42) *inermis*

16' EL/SpL usually < 0.90. If greater (some *belti*), then gaster T1 with abundant decumbent pilosity 17

17(16') Clypeal apron with median tooth 18

17' Clypeus emarginate to evenly convex 19

18(17) Promesonotum with thick rounded vermiculate rugae. Metapleural lobes well developed, triangular. (Trinidad, Guyana, Amazonian Peru and Colombia, Mato Grosso) (Figs. 28-30, 89-90) *lirata*

18' Promesonotum areolate-rugose to vermiculate rugose; rugae narrower, sharper. Metapleural lobes low, broadly rounded. (Paraguay, Mato Grosso and Minas Gerais) (Figs. 24-27, 87-88) *germaini*

19(17') Eyes small and propodeal spines long and horizontal (EL/SpL < 0.46). (Belize, southern Mexico) (Fig. 45) *cornuta*

19' EL/SpL > 0.46. Propodeal spines more inclined 20

20(19') Eye smaller, elliptical (OI 0.13-0.14). Petiolar peduncle with lamellate keel. Sides of postpetiolar node distinctly areolate. (southern Brazil) (Fig. 31) *lacertosa*

20' Eye larger, oval (OI 0.18-0.22). Petiolar keel not lamellate. Sides of postpetiolar node smooth, or nearly so. (southern Mexico to Colombia) (Figs. 35-39, 91-92) *belti*

21(15') Scapes with longer erect to suberect hair in addition to shorter decumbent to appressed pilosity (in *exsulans* and some *brunnea*, erect hairs can be sparse and little longer than decumbent hair) 33

21' No erect hair on scapes 22

22(21') WL 0.90-0.99mm. EL/SpL 0.48-0.56. (southern Brazil) (Figs. 32-33) *pellecta*

22' Smaller. If WL approaches 0.90mm, then EL/SpL either < 0.30 or > 0.70 23

23(22') Propodeal spines very long (PSI 0.29), strongly inclined. Eyes small (EL/SpL 0.13). (southern Brazil) (Fig. 34) *sicaria*

23' Propodeal spines usually much shorter. If similar in size, then not strongly inclined. EL/SpL > 0.20 24

24(23') WL > 0.71mm. Pilosity on gaster not differentiated into two distinct kinds. (Costa Rica) (Fig. 43) *neilyensis*

24' WL usually < 0.71mm. If similar in size, hair on gaster differentiated into short-decumbent and longer-erect 25

25(24') Clypeal apron with median tooth. Gaster T3 with short median spine. (Colombia) (Fig. 63) *tribrocca*

25' Clypeal apron without a median tooth. Gaster T3 unarmed 26

26(25') Erect-suberect hairs absent from head dorsum (or short and limited to posterior head) and sparse on mesosoma. WL 0.51-0.63mm 27

26' Erect hair present on middorsum and posterior head. If missing (*scobinata*), then > 10 pairs of erect hairs on mesosoma dorsum 28

27(26) Postpetiolar sternum wedge-shaped in side view; node less vaulted. Sides of head and pronotum strongly microareolate, making macrosulpture (if present) difficult to see. (central Mexico to Costa Rica) (Figs. 77-78, 103) *cuneola*

27' Postpetiolar sternum not wedge-shaped; node more vaulted. Sides of head and pronotum with more or less smooth, shiny intervals. (Caribbean Islands, northern South America; possibly Central America) (Figs. 74-76, 101-102) *curvipubens*

28(26') Part of gaster T1 microareolate. Most erect hairs stiff, cuneate-fimbriate. (Argentina) (Figs. 72-73) *minima*

28' Gaster T1 smooth. Stiff hairs absent (except on some *micromma*) 29

29(28') Rugae on pronotal dorsum and sides unbranching and nearly straight, with smooth and shiny intervals. Sides of head below eye nearly smooth, strongly shining. (northeastern Colombia over 1000m) (Figs. 65, 94) *nevadensis*

29' Rugae on promesonotum and sides of pronotum undulating and with lateral spurs or branches, sometimes forming areolate patches; intervals appear granular, not strongly shining. Sides of head rugose-areolate 30

30(29') Eye with 2-5 facets. Mesosoma sides opaque with dense areolate microsculpture, but macrosulpture absent. Mesosoma dorsum with 8-10 pairs of erect hairs. (Surinam, Pará State of Brazil) (Fig. 71) *micromma*

30' Eye with 4-21 facets (rarely < 7). Mesosoma sides with rugose macrosulpture in addition to weak or distinct microsculpture. Mesosoma dorsum with \geq 12 pairs of erect hairs 31

31(30') Macrosulpture tuberculate on posterodorsum of head (Fig. 100). Erect hair usually absent from head dorsum, but sometimes short, sparse and mostly limited to posterior rim. (Trinidad, South America east of Andes to Paraguay) (Figs. 61-62, 100) *scobinata*

31' Posterodorsum of head rugose to areolate; no tubercles. Middorsum of head with long erect hair .. 32

32(31') Clypeal apron convex. Nuchal groove clearly visible in lateral view. Propodeal spines generally wider. Petiolar keel distinct. (Mexico, Nicaragua; possibly into Colombia) (Figs. 55-57, 97-98) .. *innotabilis*

32'. Clypeal apron truncate in Central America. Nuchal groove not clearly visible in lateral view. Propodeal spines usually slender. Petiolar peduncle with little or no keel. (Panama, South America, Dominican Republic) (Figs. 58-60, 99) *alzatei*

33(21) WL 0.93-1.02mm. Propodeal spines long (SpL > 0.20mm; PSI > 0.25), horizontal. Gaster with few or no decumbent hairs. (Belize, southern Mexico) (Fig. 45) *cornuta*

33' WL usually < 0.90mm. If larger (some *belti*, *brunnea*, *creightoni*), then decumbent hair abundant on gaster 34

34(33') Gaster T1 with two distinct kinds of pilosity: shorter, decumbent hairs and longer, erect hairs 36

34' Hair on gaster T1 not clearly sorting into two distinct kinds 35

35(34') Pilosity on gaster T1 more dense and decumbent to subdecumbent. Petiolar peduncle with very large keel. (Samoa) (Fig. 44) *exsulans*

35' Pilosity non gaster T1 more sparse and erect to subdecumbent. Petiolar peduncle with little or no keel. (Central America) (Figs. 40-42) *inermis*

36(34) Eyes larger (> 19 facets), oval. Macrosulpture on pronotal disc usually predominantly areolate and extending uninterrupted onto anterior face of pronotum (if predominantly rugose, then eye with > 25 facets). (southern Mexico to Colombia) (Figs. 35-39, 91-92) *belti*

36' Eyes smaller, often elliptical. Pronotal disc predominantly longitudinally rugose, vermiculate, or carinate. Anterior edge of disc transversely rugose, rugose-areolate, or carinate 37

37(36') Promesonotum with nearly straight, longitudinal carinae; no lateral branches; intervals very smooth and shiny. Eye small, elliptical (EL < 0.10. (Caribbean Islands) (Fig. 64) *carinata*

37' Promesonotum longitudinally rugose, vermiculate, or rugose-areolate. If intervals smooth and shiny, then eyes oval and EL > 0.10 38

38(37') Clypeus evenly convex. Postpetiolar node from above subtrapezoidal; sternum long, flat, without anterior lip. (Caribbean Islands) (Figs. 50, 93) *brunnea*

38' Clypeus usually emarginate or truncate. If convex, then postpetiolar node not subtrapezoidal; sternum shorter, with distinct anterior lip 39

39(38') Eye elongate-oval. A strong transverse carina runs across pronotal shoulders. Pronotal disc and sides with weakly undulating rugae and nearly smooth interrugal spaces. Propodeal spines often with downcurved tips. (Venezuela) (Fig. 49) *unguispina*

39' Eyes not elongate. Anterior pronotum may have 1 or more transverse rugae, but not carinae. Pronotal disc rugose or rugose-areolate. Propodeal spines straight 40

40(39') WL 0.54-0.66mm. Mesosoma low, slender (PW < 0.37mm). Propodeal spines short, sometimes absent (SpL < 0.11mm). Postpetiole generally widest in anterior half (Fig. 66) (southern Mexico, Central America, Dominican Republic) (Figs. 66-70) *leptonana*

40' Generally larger, with MHI > 0.90, PW > 0.37mm, and SpL > 0.10mm. Postpetiole subtrapezoidal or subrectangular (Figs. 51, 53) 41

41(40') Metanotum strongly interrupts contour of mesosoma profile. Sides of head rugose or effaced rugose-areolate. EL/SpL > 0.65. (Colombian and Ecuadorian Andes above 1000m) (Figs. 46-48) *merenbergiana*

41' Metanotum with little or no effect on overall shape of mesosoma profile. EL/SpL < 0.65. Sides of head rugose-areolate; not effaced. (southern Texas to Panama) (Figs. 51-54, 95-96) *creightoni*

SPECIES DESCRIPTIONS

Stigmatica-Group and Related Species*Rogeria ciliosa* new species

Figs. 2-4

Additions to *stigmatica*-group diagnosis. WL 1.06-1.20mm. Mandibles triangular; coarsely punctured, weakly carinulate. Anterior clypeus evenly convex. Propodeal spines long (> 0.20mm), strongly inclined and diverging. Metapleural lobes well developed; angular. Inferior petiolar process reduced to a small step. Dorsal head, mesosoma and gaster densely covered with long flexuous hairs; terminal segments of gaster with dense, stiff erect hair.

Holotype and Paratype Workers.—TL 4.1-4.8 (4.1), HL 0.90-1.02 (0.90), HW 0.78-0.89 (0.785), SL 0.69-0.77 (0.69), EL 0.14-0.16 (0.15) (32-42 facets), PW 0.60-0.66 (0.60), WL 1.06-1.20 (1.06), SpL 0.24-0.28 (0.245), PetL 0.44-0.53 (0.44), PpetL 0.23-0.29 (0.235)mm, CI 0.84-0.87 (0.87), OI 0.17-0.19 (0.19), SI 0.85-0.90 (0.88), PSI 0.21-0.23 (0.23). N=9

Mandibles with 7-9 teeth (3 apical teeth decreasing in size basad, followed by 4-6 small, subequal teeth). Palpal formula 3,2. No clypeal apron. Body of clypeus not projecting over anterior edge. Nuchal grooves weak. Pronotal shoulders rounded. Ventral petiole with a low median carina rather than a distinct keel. Node distinct, wider than long. Postpetiole dorsal view shape as in Fig. 66. Postpetiolar sternum short, with a distinct anterior lip followed by a narrow sulcus. Gaster large (GW/WL 0.94-0.97). Quadrata plate of sting apparatus with somewhat reduced apodeme that lacks lobes on anterodorsal corner; oblong plate ventral arm very reduced (see also Fig. 3 and *stigmatica*-group diagnosis).

Body of clypeus with fragmented longitudinal rugulae surrounded by effaced areolate sculpture. Longitudinal rugae on head dorsum mostly confined to the frontal lobes, frontal area, and midline. Frontal lobes rugose-areolate in some paratypes. Rest of dorsum, cheeks, venter, and posterior head densely areolate; intervals bearing shallow piligerous punctures. Promesonotum with the same areolate sculpture. Mesopleura, metapleura, and sides of propodeum with more irregular and confused areolate sculpture. Metanotal groove scrobiculate. Dorsal face of propodeum transversely rugose with undulating,

smooth intervals or largely areolate with a few carinulae between the spines. Most of petiole and postpetiole strongly areolate as well. Sculpture on anterior petiolar node effaced; dorsum of peduncle smooth. First tergum and sternum of gaster rather coarsely punctured in front and more finely punctured caudad; smooth and shiny between punctures.

Fine, long, flexuous, erect to suberect hair covers middorsum of head, dorsum of mesosoma, dorsum and sides of waist, and first segment of gaster. On terminal segments of gaster these become denser, stiffer and more erect to form brush-like rings. Shorter, subdecumbent hairs occur on lateral and ventral surfaces of head, dorsal surfaces of scapes, sides of mesosoma, and sometimes dorsal face of propodeum. Very short, decumbent to appressed pilosity on extensor surfaces of legs and ventral petiole. Median hair on clypeus fine and often obscured by surrounding paired hairs.

Body uniformly rusty-brown; appendages lighter, more yellowish-brown.

Paratype Queen.—TL 5.3, HL 1.04, HW 0.91, SL 0.80, EL 0.27, PW 0.97, WL 1.50, SpL 0.30, PetL 0.58, PpetL 0.30mm, CI 0.88, SI 0.88, PSI 0.20. N=1

Differing from paratypes only in the normal queen characters (Fig. 4). Mandible 8-toothed. Short parapsidal furrows present on mesoscutum. Both mesoscutum and mesoscutellum with same dense areolate sculpture as in worker. Metanotum vaguely microareolate. Dorsal face of propodeum with transverse carinulae mesad; areolate laterad.

Discussion.—*Rogeria gibba* (Figs. 5-6) from western Ecuador and Colombia resembles *ciliosa* in size, sculpture and pilosity, but has different mandibles, clypeal margin, propodeal spines, and metapleural lobes. *Rogeria stigmatica* and *megastigmatica* (Figs. 7-13) from the Pacific have much shorter propodeal spines, less punctured gaster, and different pilosity.

The name *ciliosa* refers to its dense covering of flexuous hairs.

Distribution.—This species is known only from lowland rain forests in the Amazonian basin of Ecuador and the Orinocan basin of Venezuela.

Material Examined.—*Holotype* locality. ECUADOR: Napo Province, Limoncocha, 250m, 18-VI-1976, #B-348 (S. and J. Peck) [MCZ].

Paratype locality. 9 workers, 1 queen, VENEZUELA: Bolívar State, Campamento Río Grande, 8.07N 61.42W, 250m, 14-VIII-1986, sifted leaf mold

and rotten wood, #8572-12 (P. S. Ward) [2 workers dissected: mouthparts, 2 stings] [BMNH, LACM, MCZ, MIZA, MZSP, USNM].

Rogeria gibba new species
Figs. 5-6

Additions to *stigmatica*-group diagnosis. WL 0.85-0.93mm. Mandibles subtriangular. Clypeal apron slightly convex medially, with sharp corners on either side. Eyes with 16-20 facets. Mesosoma profile humpbacked. Propodeal spines short (<0.15mm), not strongly inclined. Propodeal spiracle rather large, within one diameter of posterior edge of mesosoma. Metapleural lobes reduced to short carinae, sometimes nearly absent. No inferior petiolar process. Dorsal head, mesosoma and gaster densely covered with long flexuous hairs.

Holotype and Paratype Workers.—TL 3.5-3.8 (3.7), HL 0.78-0.85 (0.83), HW 0.73-0.81 (0.78), SL 0.54-0.60 (0.59), EL 0.09-0.10 (0.10) (15-22 facets), PW 0.51-0.57 (0.55), WL 0.85-0.96 (0.93), SpL 0.11-0.14 (0.11), PetL 0.40-0.49 (0.46), PpetL 0.21-0.23 (0.22)mm, CI 0.91-0.96 (0.94), OI 0.12-0.13 (0.13), SI 0.72-0.77 (0.76), PSI 0.12-0.15 (0.12). N=10

Mandibles with 5 teeth diminishing in size basad. Palpal formula 3,3. Body of clypeus does not project over apron. Head capsule about as wide as long. Nuchal grooves visible from below or behind. Promesonotal dorsum almost flat and dropping abruptly to metanotum (Fig. 5). Petiolar peduncle lacks inferior petiolar process. Petiolar node distinct, bulbous, wider than long. Postpetiole node subrectangular from above; sternum short. Gaster large (GW/WL 0.90-0.97). Sting apparatus like that of *ciliosa*, except for: 1) a longer fulcral arm on the oblong plate (like *inermis* Fig. 42), 2) no companion seta on gonostylus, 3) more enlarged lancet apex, and 4) no anterolateral processes on sting base (Fig. 6).

Middorsum of head longitudinally rugose becoming rugose-areolate behind level of eyes. Laterodorsa, posterior, sides, and ventral surfaces of head areolate with minutely granulate ridges; intervals smooth except for some piligerous punctures. Promesonotum with the same sculpture as sides and back of head. Meso- and metapleura with more confused areolate sculpture, but similar ridges and intervals. Metanotal groove scrobiculate. Dorsal face of propodeum and part

of posterior face transversely rugulose. Rest of posterior face shagreened. Petiolar peduncle colliculate; anterior face of node smooth, except for piligerous punctures. Rest of petiolar node and all of postpetiolar node transversely areolate-rugose, with granulate ridges and smooth to weakly punctured intervals, as on head and promesonotum. Gaster smooth and shiny, dotted by numerous small, shallow piligerous punctures.

Dorsum of head, mesosoma, top and sides of waist, and all sides of gaster densely covered with long, flexuous, erect to suberect hairs and without interspersed shorter pilosity.

Body rusty-brown, gaster slightly darker. Antennae, legs and mandibles yellowish-brown to yellow.

Queens.—TL 4.2-4.3, HL 0.83-0.85, HW 0.80, SL 0.58-0.59, EL 0.19-0.20, PW 0.72-0.73, WL 1.14-1.15, SpL 0.15-0.17, PetL 0.49-0.53, PpetL 0.24-0.25mm, CI 0.94-0.96, SI 0.73-0.74, PSI 0.13-0.15. N=4

Queens differ from the workers in the usual and the following ways. Short parapsidal furrows present. Longitudinal areolate-rugose sculpture on median head extends to posterior of head. Median pronotum transversely rugose. Mesoscutum with longitudinally rugose sculpture that becomes more areolate on mesoscutellum.

Discussion.—See the *ciliosa* discussion for comparison. Like *stigmatica* also in many features, but differs in pilosity and shape of promesonotum. The name *gibba* is from Latin meaning humpback.

Distribution.—One worker is from the eastern side of the central cordillera in northern Colombia, the rest are from about 1000km away on the western slope of the Andes and the coastal range of northern Ecuador. In all three areas they were collected at 300-800m elevation in natural rain forest, probably by Berlese sampling.

Material Examined.—**Holotype locality**. ECUADOR: Pichincha Province, 4 km E. Santo Domingo de los Colorados, 22-VI-1975, #B-304 (S. and J. Peck) [MCZ].

Paratype localities. COLOMBIA: 1 worker, Antioquia Department, near El Bagre, Providencia, Estación Biológica, Zona Buenos Aires, 30-31-XII-1977 (C. Kugler) [MCZ]; 1 worker, Chocó Department, Río Napipi, 1968 (P. A. Silverstone) [LACM]. ECUADOR: 5 workers, holotype locality, 22-VI-1975 and 8-VII-1976 (S. and J. Peck) [2 mouthparts, stings] [BMNH, CKC, MCZ, MZSP]; 2 workers,

Pichincha Province, 47km S. Santo Domingo, Río Palenque Station, 23-V-1976 (S. and J. Peck [MCZ]; 1 worker, Pichincha Province, Tinalandia, 16km SE. Santo Domingo de los Colorados, 4-VI-1976 (S. and J. Peck) [MCZ].

Nontype localities. ECUADOR: 3 queens, Pichincha Province, 47km S Santo Domingo, Río Palenque Station, 1975 (S. and J. Peck); 1 queen, Manabí Province, 73km NE Chone, 12-VI-1976 (S. and J. Peck) [MCZ].

Rogeria stigmatica Emery

Figs. 7-12

Rogeria stigmatica Emery 1897:589. Syntype workers, NEW GUINEA: Friedrich-Wilhelmshafen [=Madang] (Biró) [MHN] [Both syntypes examined].

Rogeria stigmatica subsp. *sublevinodis* Emery 1914:415. Syntype workers, LOYALTY ISLANDS: Maré, Raoua [MHN] [Both syntypes examined]. N. syn.

Rogeria sublevinodis, Wilson and Taylor 1967:76, Fig. 61.

Rogeria manni Santschi 1922:353. Syntype workers, SOLOMON ISLANDS: Fulakora, Ysabel Is. (Mann) [MCZ, NMB] [12 syntypes examined]. N. syn.

Lordomyrma manni; Brown 1953:4.

Additions to *stigmatica*-group diagnosis. WL 0.72-0.92mm. Mandibles usually subtriangular. EL usually ≥ 0.10 mm. Propodeal spiracle \leq half its diameter from edge of infradental lamella. Propodeal spines short (PSI 0.07-0.13), strongly inclined dorsad. Metapleural lobes much reduced. Inferior petiolar process absent. Abundant decumbent hair on head, mesosoma, waist and gaster; erect hairs rather sparse, not flexuous.

Workers.— TL 3.0-3.7, HL 0.66-0.83, HW 0.58-0.71, SL 0.46-0.61, EL 0.05-0.15 (7-34 facets), PW 0.44-0.52, WL 0.72-0.92, SpL 0.05-0.10, PetL 0.32-0.42, PpetL 0.19-0.23mm, CI 0.84-0.92, OI 0.08-0.22, SI 0.79-0.87, PSI 0.07-0.13. N=28

Mandibles subtriangular (usually) to triangular; with 5 subequal teeth or 3 apical teeth followed by 3-4 (rarely 5) smaller teeth or denticles. Palpal formula 3,3. Little or no clypeal apron; median clypeal margin truncate, weakly convex, or weakly angular. Body of clypeus not projecting over clypeal margin. Eyes oval, large (EL 0.10-0.15mm and 17-34 facets), except in some of the Papua New Guinea workers (EL 0.05-0.07mm; 7-9 indistinct facets). Nuchal groove distinct from behind, but not clear in side view. Mesonotum with evenly convex profile. Metanotal suture narrow, emphasized by a sharp ridge at anterior edge of propodeum.

Node large, wider than long, more or less symmetrical in side view (Fig. 8). Postpetiolar node in side view rounded front to back; usually widest in anterior half, much as in Fig. 66, but sometimes widest midlength. Postpetiolar sternum short. Sting apparatus like that of *ciliosa* (Fig. 3), except for: 1) spiniform medial and lateral projections from anterodorsal corner of quadrate plates, 2) smaller valve chamber, and 3) lack of anterolateral processes on sting base (Fig. 9). Gonostylus sometimes with no clear sensillar gap; sometimes lacking a companion seta. The "Rogeria (*stigmatica* group) spp. 1 and 2" in Kugler (1978b) are both *stigmatica*. The sting shown here is more accurate than the previous one, which was not in full lateral orientation when drawn.

Middorsum of head longitudinally rugose; rest of head, including venter, coarsely areolate. Dorsum of promesonotum coarsely areolate to rugose (intermediate specimens predominantly areolate, but with elongate cells or short rugae medially; rarely, rugae also occur on shoulders). Anterior and sides of mesosoma areolate, finely so on neck and ventrad on meso- and metapleura. Spaces in sculpture smooth except for piligerous punctures. Dorsal face of propodeum areolate along very anterior margin, followed by either transversely rugulose or densely punctate sculpture, or both in varying degrees of density and definition. Petiolar peduncle finely colliculate or smooth. Anterior and apex of node smooth or areolate; posterior face and sides areolate, sometimes with a few rugae. Postpetiole transversely rugose-areolate behind, becoming more effaced anteriorly, often leaving anterior face smooth and shining.

Decumbent to subdecumbent pilosity covers most of body. Sparser erect to suberect hair also on dorsa of scapes, head, mesosoma, nodes, and gaster. Erect hair moderately abundant on gaster T1 of most specimens (Fig. 8), but sparse on specimens from Papua New Guinea. Body of clypeus with strong median seta.

Color of mandibles, frontoclypeal region, antennae, and legs light brownish-yellow to brown. Rest of body light brown to blackish-brown.

Queens.— TL 3.6-4.5, HL 0.73-0.85, HW 0.66-0.75, SL 0.53-0.62, EL 0.19-0.24, PW 0.60-0.71, WL 1.00-1.17, SpL 0.10, PetL 0.41-0.48, PpetL 0.21-0.26mm, CI 0.87-0.90, SI 0.80-0.84, PSI 0.09-0.10. N=6

As in worker except for the usual caste differences. Mesosoma habitus as in Fig. 10. Queen from McAdam Park, Papua New Guinea with median bulge on pronotum. Pronotum areolate on sides; finer and transversely rugose-areolate mesad. Mesoscutum longitudinally rugose; mesoscutellum areolate-rugose. Metanotum smooth. Mesosoma sides confused areolate, except for smooth area on mesokatepisterna and costulate metapleural gland bullae. Wing venation as in *lirata* (Fig. 30), except for Rs vein as in *belti* (Fig. 37).

Males.—TL 2.6-3.1, HL 0.45-0.54, HW 0.56-0.66, SL 0.27-0.35, EL 0.20-0.26, PW 0.50-0.62, WL 0.84-1.04, PetL 0.22-0.30, PpetL 0.14-0.19 mm, Cl 1.22-1.27, SI 0.48-0.53. N=3

Mandibles with a large apical tooth and 4 others decreasing in size basad. Posterior lobe of clypeus projects more broadly between antennae than in worker; anterior clypeal margin weakly convex. Frontal lobes absent. No distinctly impressed frontal area. Funicular segment 6 curved and longer than 4 and 7; more extremely curved and elongate on one side of the head than the other. Posterior outline of head medially concave; sharp crests run from ocelli to posteroventral corners of head, which project slightly and fit around prothoracic sternum when head is retracted. Mesosoma and waist as shown in Fig. 11. Genitalia as shown in Fig. 12. Head integument vaguely roughened. Mesosoma and waist smooth, except along furrows and on sides of propodeum, metepimera, and petiolar peduncle. Gaster smooth and shining. Pilosity all erect to suberect, except around eyes. Propodeum nude. Color variation as in worker.

Discussion.—According to Emery (1914) and Wilson and Taylor (1967), *sublevinodis* differs from *stigmatica* in having larger size, coarser sculpture on head and mesosoma, and smooth nodes with coarser punctures on other parts of the waist. When two of Emery's *stigmatica* syntypes and two of his *sublevinodis* syntypes in the MHN were compared side by side, the TL and WL of the *stigmatica* syntypes fell within the range of the *sublevinodis* syntypes. The sculptural characteristics were not distinct either, except on the dorsal face of the propodeum, which is transversely rugulose and very weakly punctate and shiny in *stigmatica* syntypes, but densely punctate and lacking rugulae in the *sublevinodis* syntypes. However, intergrades with rugulae and various degrees of

punctuation occur in the Solomon Islands, Irian Jaya, and Pohnpei.

Santschi (1922) claimed that *manni* differed from *stigmatica* in a variety of ways. After examining *manni* types, I could confirm only one clear way they differ from the types of *stigmatica* and *sublevinodis*: the presence of rugose sculpture instead of areolate sculpture on the promesonotum. However, in non-type material, I found all intermediate states, sometimes within the same locality. Other supposedly different characters also intergrade or are due to the *manni* types being at the small end of the size distribution.

I have too few collections from Papua New Guinea to know if those specimens with unusually small eyes and few erect hairs on gaster T1 might be a distinct species.

See sister species *megastigmatica* description. See also *ciliosa* and *gibba* for discussions of related species in South America and *exsulans* for discussion of a not so related species from the Pacific.

Distribution and Behavior.—*Rogeria stigmatica* is known only from the Central and West Pacific, from as far east as Tahiti to the western tip of the Island of New Guinea and from about 22 S to 7 N.

Most collections come from berlesate or sifting of leaf mould, rotten wood, soil, moss, or bases of fern epiphytes in rain forest. The one nest series with ecological data (Sorong, Irian Jaya) is from rotten wood. Mann (1921:451) found colonies beneath stones and logs. Twelve specimens, were collected on imported coconuts in Honolulu. If nesting occurs in coconuts, colonization of Polynesia and Melanesia from South America may have occurred by rafting on the South Equatorial Current.

Mann (1921:451) observed workers producing long, worm-like stands from the anal area when the nest was disturbed.

Material Examined.—SOCIETY ISLANDS: Tahiti, Punaauia District (J. Dixon). AMERICAN SAMOA [=E. Samoa]: Tutuila [sting; whole specimen]; Tafuna; Alega (T. E. Woodward). WESTERN SAMOA: Falepuna [sting]; Matautu; Vaipoto; Poutasi (T. E. Woodward); LeMafa; Gagafomauga (G. Ettershank); Apia (H. Swale). WALLIS ISLANDS: Nukuione (G. Hunt) [mouthparts, sting, whole specimen]. ÎLES DE HORNE [=Hoorn Islands]: Futuna (G. Hunt). FIJI: Vanua Ava; Waiyanitu; Ovalau; Lasema; Somosomo; Nagasau; Saiaro; Munia; Nadarivatu; Labasa (W. M. Mann);

Sigatoka (W. L. and D. E. Brown) [2 stings; male genitalia]. VANUATU [=New Hebrides]: Espiritu Santo (E. O. Wilson). LOYALTY ISLANDS: Maré. SOLOMON ISLANDS: Ysabel, Fulakora [sting]; Ugi [=Uki] (W. M. Mann) [sting]. PAPUA NEW GUINEA: New Guinea, Huon Peninsula (E. O. Wilson); Wau, McAdam Park (S. Peck); Friedrich-Wilhelmshafen [=Madang] (Biró). INDONESIA: Irian Jaya, Sorong (W. L. Brown). CAROLINE ISLANDS: Ponape [=Pohnpei] (Y. Kondo). 170 workers, 9 queens, 3 males [CUIC, MCZ, MHN, USNM].

Rogeria megastigmatica new species

Fig. 13

Holotype and Paratype Workers.— TL 4.5-4.9 (4.5), HL 1.01-1.09 (1.01), HW 0.90-1.00 (0.91), SL 0.77-0.83 (0.77), EL 0.16-0.19 (0.16) (41-52 facets), PW 0.62-0.70 (0.62), WL 1.18-1.30 (1.18), SpL 0.10-0.11 (0.11), PetL 0.51-0.52 (0.52), PpetL 0.28-0.31 (0.28)mm, CI 0.88-0.92 (0.90), OI 0.18-0.19 (0.18), SI 0.83-0.87 (0.85), PSI 0.08-0.09 (0.09). N=5

Like *stigmatica* in most respects, but markedly larger (at least 35% larger than *stigmatica* on other Solomon Islands). Metanotal groove not as narrow or sharply defined. Petiolar node strongly asymmetrical in side view (Fig. 13).

Mandibles triangular, with at least 6 teeth, some basal denticles may have been abraded. Median clypeal apron convex. Mandibular carinulae effaced. Pronotum areolate with a rugose-areolate patch in center of disc. Dorsal face of propodeum transversely rugulose. Petiolar peduncle smooth; sides of node areolate; posterior face transversely rugulose-areolate or areolate-rugose.

Material Examined.—**Holotype locality.** SOLOMON ISLANDS: Guadalcanal, Ilu Bush, 16-III-1962, #1181 (P. J. M. Greenslade) (MCZ). **Paratype localities.** SOLOMON ISLANDS: 1 worker, holotype locality [MCZ]; 3 workers, San Cristobal, Kira Kira, 24-IV-1962, #1579 (P. J. M. Greenslade) [MCZ].

Rogeria prominula new species

Fig. 14

Additions to *stigmatica*-group diagnosis. WL 0.78mm. Basal angle of mandibles greatly reduced. Body of clypeus projects strongly over the trun-

cate clypeal apron. Frontal region elevated and laterodorsa slightly concave. Eyes very small. Metapleural lobes and metapleural gland bulla reduced. Body almost devoid of erect hair.

Holotype Worker.— TL 2.88, HL 0.66, HW 0.56, SL 0.51, EL 0.05 (4 facets), PW 0.435, WL 0.78, SpL 0.15, PetL 0.30, PpetL 0.19mm, CI 0.85, OI 0.09, SI 0.91, PSI 0.19.

Mandibles with 5 teeth, basal angle greatly reduced (Fig. 14). Frontal lobes wide, closely approximated. Eyes small, round, sunken; facets indistinct. Nuchal groove visible laterally as a distinct notch. Pronotal shoulders well rounded. Dorsal face of propodeum wide, weakly concave. Propodeal spiracle about 2 diameters from edge of infradental lamella. Metapleural lobes reduced to low carinae. Metapleural gland bulla small. Petiolar node large, wider than long. Petiolar peduncle short, with weak keel and small, dentate inferior process. Postpetiole subrectangular in dorsal view. Postpetiolar sternum projects shelf-like under articulation with petiole. GW/WL 0.84. Terminal segments of gaster not rotated ventrad. Shaft of undissected sting slender, with slightly enlarged apex; lancets acute and appear strong.

Mandibles strongly carinulate for most of length. Frontal area impressed, smooth. Median head longitudinally rugose-areolate. Cheeks near antennal insertions microareolate. Laterodorsa, sides and posterior head densely macroareolate; cells small, usually obscuring the effaced microareolate background. Promesonotal dorsum with same areolate sculpture as on back and sides of head. Mesosoma sides strongly microareolate and macroareolate; in different places one or the other predominates. Scrobiculate sculpture in mesosoma sutures. Dorsal face of propodeum distinctly microareolate, with branching rugulae crossing between propodeal spines. Peduncle and anterior face of petiole as well as sterna of petiole and postpetiole microareolate; rest of petiole and postpetiole macroareolate, somewhat effaced mesad. Gaster T1 densely covered with piligerous punctures; punctures weaker caudad. Other terga smooth except for vaguely roughened posterior margins.

Most of body covered with very fine, appressed pilosity. Sparse erect hairs on clypeus, frontal lobes and nearby head middorsum. A few short, decumbent hairs on mesosoma dorsum; dense erect hairs on terminal segments of gaster.

No pilosity on ventral petiole.

Discussion.—This is perhaps the most aberrant *Rogeria* species, with its unusual head shape and pilosity. But it has the characteristic *Rogeria* antennae, nuchal grooves and square anteroventral corners of the pronotum. It has affinities with *ciliosa*, *gibba*, and *stigmatica*, as described in the *stigmatica*-group discussion.

The name *prominula*, meaning little prominence, describes the body of the clypeus.

Material Examined.—**Holotype locality.** BRAZIL: Amazonas, Ig. Marianil, Rio Branco Road, 24km NE Manaus, 22-VIII-1962, #M-2 (W. L. Brown) [MCZ].

***Rogeria besucheti* new species**
Figs. 15-16

Additions to *stigmatica*-group diagnosis. WL 0.67-0.75mm. Eye small (8-10 facets). Propodeal spiracles small, more than 3/4 diameter from infradental lamella. PSI 0.17-0.20. Metapleural lobes well developed. Inferior petiolar process a small step. Head, mesosoma, nodes and gaster with abundant decumbent pilosity and more sparse erect hairs.

Holotype and Paratype Workers.— TL 2.7-3.1 (2.85), HL 0.65-0.71 (0.66), HW 0.59-0.63 (0.60), SL 0.43-0.49 (0.44), EL 0.05-0.08 (0.06) (8-10 facets), PW 0.42-0.46 (0.43), WL 0.67-0.75 (0.69), SpL 0.12-0.15 (0.13), PetL 0.30-0.34 (0.32), PpetL 0.16-0.18 (0.18)mm, C10.87-0.90 (0.90), OI 0.08-0.13 (0.10), SI 0.72-0.78 (0.72), PSI 0.17-0.20 (0.18). N=7

Holotype mandible with 5 visible teeth decreasing in size basad. In paratypes, mandibles always with 3 apical teeth, but basal teeth may have additional denticles or be replaced by pairs of denticles. Palpal formula 3,2. Clypeal apron truncate; body of clypeus projecting enough to block view of apron in full dorsal view. Pronotal shoulders rounded. Shallow metanotal groove shallow present on dorsum and sides of mesosoma. Propodeum lacking a distinct transverse carina at anterior border. Peduncle of petiole with weak ventral keel; inferior process reduced to a small step. Petiolar node bulbous, wider than long. Postpetiolar node widest in anterior half (as in Fig. 74). Postpetiolar sternum short, anterior lip not greatly prominent. GW/WL 0.91-0.98. Terminal segments of gaster slightly rotated ventrad, but not enough to make T3 the distalmost point of the

gaster. Sting apparatus much like that of *ciliosa* (Fig. 3), but: 1) anterior apodeme of spiracular plate widest midlength, 2) anterodorsal corner of quadrate plate longer, narrower, 3) anterior apodeme of oblong plate longer, 4) gonostylus a little longer, with two companion setae and less distinct gap in setation and 5) sting base lower and without anterolateral processes (Fig. 16).

Longitudinally rugose macrosculpture on frontal lobes becomes rugose-areolate on middorsum. Laterodorsa, sides, and posterior head areolate with rather small areolae; intervals smooth and shining, except for piligerous punctures. Pronotal disc varies from all rugose-areolate to all areolate. Rest of promesonotum slightly less coarsely areolate. Intervals smooth, except for piligerous punctures. Dorsal face of propodeum densely microareolate, with or without overlying transverse rugulae.

Dorsum and anterior face of petiolar node smooth; rest of petiolar and postpetiolar nodes effaced areolate. Gaster predominantly smooth and shiny; T1 and S1 with piligerous punctures that in some specimens become weaker caudad. Remaining terga and sterna very weakly roughened and shiny.

Paraguayan specimens have suberect hair on scapes; others do not. Head dorsum with suberect hairs. Pilosity on mesosoma dorsum and nodes ranges from short and decumbent to long and erect; all curving quite strongly toward midline. Gaster T1 similar, but with no erect hairs. Terminal segments of gaster with rather dense erect hair and decumbent pilosity. No hair on ventral petiole.

Extremities and mandibles light brownish yellow. Rest of body brown with more yellowish than reddish accents; frontoclypeal area and terminal segments of gaster lighter.

Discussion.—*Rogeria besucheti* differs from *ciliosa*, *gibba*, *prominula*, and *blanda* in pilosity. It differs from *stigmatica* and *megastigmatica* in mesosoma shape, propodeal spine length, and generally smaller eye size.

This species is named for Claude Besuchet, who as director of the MHN in Geneva was most helpful and patient in loaning material valuable for this work.

Distribution.—Paraguayan specimens come from gallery forest with some bamboo. Peruvian specimens are from mixed broadleaf primary for-

est on a steep hillside at 1000m. In both localities collections resulted from Berlese and Winkler sampling of leaf litter and rotten wood.

Material Examined.—**Holotype locality.** PARAGUAY: Alto Paraná Province, Puerto Santa Teresa, 3-XI-1979 (F. Baud, et al.) [MHN].

Paratype localities. COLOMBIA: 3 workers, Putumayo Department, Villa Garzón, 23-VII-1977 (D. Jackson) [BMNH]. PERU: 2 workers, Pasco Department, near Pozuzo, 1000m (C. Kugler and R. R. Lambert) [mouthparts, sting] [MCZ, MZSP]. PARAGUAY: 1 worker, San Benito Province, Itapúa, 29-X-1982 (F. Baud, et al.) [MHN].

Rogeria blanda Fr. Smith

Figs. 17, 83-84

Myrmica blanda Fr. Smith 1858:131. Syntype workers, BRAZIL: Amazonas, Ega [=Tefé] [BMNH] [4 syntypes examined].

Irogeria foveata Kempf 1964:64, Figs. 19-20. Holotype and paratype workers, BRAZIL: Amazonas, Manaus (K. Lenko) [MZSP] [Paratype examined].

Rogeria blanda; Kempf 1965:185.

Diagnosis.—WL 0.87-1.15mm. Palpal formula 2,2. Eye rather large, oval. Propodeal spines long (PSI 0.20-0.29). Petiolar node long and low. Gaster with terminal segments rotated ventrad. Inferior petiolar process dentate. Head, mesosoma, and nodes densely areolate. Body rather densely covered with long, fine, soft, erect hair; no decumbent hair.

Workers.—TL 3.0-4.0, HL 0.73-0.92, HW 0.65-0.82, SL 0.49-0.62, EL 0.12-0.16 (27-59 facets), PW 0.48-0.63, WL 0.87-1.15, SpL 0.20-0.30, PetL 0.35-0.49, PpetL 0.18-0.25mm, CI 0.85-0.91, OI 0.18-0.21, SI 0.73-0.80, PSI 0.20-0.29. N=20

Additions to description and figures of Kempf (1964). Mandibles triangular, with 6 large teeth decreasing in size basad, then basal tooth larger than neighbor. One or two denticles sometimes added between basal teeth. Clypeal apron with a shallow median notch. Nuchal grooves not visible in lateral view. Metanotal groove weak (Fig. 83) to absent. Propodeal spiracle small, strongly directed caudad. Propodeal spines long, straight or weakly upturned at apex; distinctly longer in the two specimens from Ecuador (PSI 0.29) than in the others (PSI 0.20-0.25). Metapleural lobes triangular; apex blunt to subacute. Petiolar peduncle

curved, with weak keel and dentate inferior petiolar process. Petiolar node widest in posterior half. Postpetiolar node highest in posterior half; shape from above as in Fig. 32 or Fig. 49. Gaster not enlarged (GW // WL 0.63-0.70); terminal segments rotated ventrad. Pygidial gland sculpture present. Sting apparatus nearly identical to that of *inermis* (Fig. 42).

Longitudinal rugae on frontal lobes rapidly give way to areolate sculpture usually by mid-eye level and continuing onto posterior head. Sides of head strongly sculptured: rugose-areolate in front of eye to areolate behind. Mesosoma and nodes (Figs. 83-84) also densely areolate, except for transverse carinulae between spines and smooth posterior face of propodeum. Some elongate cells on pronotal disc. Very apex of postpetiolar node sometimes smooth. No microsculpture.

Scapes with very long erect hairs and shorter hairs ranging from suberect to decumbent. Erect hair on terminal segments of gaster not brush-like. Legs with little decumbent or appressed pilosity.

Head, mesosoma, and waist black to yellowish-brown; appendages lighter. Gaster darker than rest of body. Head sometimes with black patches around and/or between eyes.

Queens.—TL 3.6-4.1, HL 0.79-0.87, HW 0.70-0.78, SL 0.52-0.58, EL 0.19-0.20, PW 0.61-0.70, WL 1.02-1.17, SpL 0.24-0.30, PetL 0.40-0.52, PpetL 0.22-0.25mm, CI 0.87-0.90, SI 0.73-0.81, PSI 0.22-0.26. N=8

Median pronotum sometimes transversely rugose-areolate; mesonotum longitudinally rugose-areolate. Otherwise, differing from the worker only in the normal queen characters. Wing venation like that of *belti* (Fig. 37).

Males.—TL 3.2-3.4, HL 0.60-0.62, HW 0.70-0.75, SL 0.23-0.26, EL 0.32-0.35, PW 0.79-0.86, WL 1.10-1.24, PetL 0.34-0.35, PpetL 0.18-0.20mm, CI 1.16, SI 0.32-0.35. N=4

All males came from Río Akabán, Venezuela. Mandibles with 4 subequal teeth. Anterior edge of clypeus with weak median notch. Frontal area a distinctly impressed triangle. No frontal lobes. Flagellomeres 2-11 straight, subequal in length and width. Habitus much like male of *belti* (Fig. 38), but junction of dorsal and posterior faces of propodeum has blunt lateral corners, and the propodeal spiracle faces more caudad.

Back of head microareolate with piligerous

punctures in the pits; median vertex with additional longitudinal rugulae. Pronotum and mesopleura largely smooth. Mesonotum densely and finely rugulose with scattered punctures in intervals. Posterior face of propodeum, nodes, and gaster smooth. Genitalia as shown in Fig. 17. Hairs shorter, less flexuous than in worker; erect to suberect and moderately dense over much of body. Color dark brown with lighter brown appendages.

Discussion.—*Rogeria ciliosa* and *gibba* from lowland South America resemble *blanda* in having long, soft, dense pilosity and areolate sculpture, but see the *stigmatica* group diagnosis.

Distribution.—*Rogeria blanda* is found in southern Central America and in South America east of the Andes to southern Brazil. Elevations range from 50m (Costa Rica) to 1000m (Venezuela). Nests have been found in trunks of cacao trees in Costa Rica and in a small rotten log suspended about 50cm above the ground in Peru.

Material Examined.—COSTA RICA: Heredia Province, Puerto Viejo de Sarapiquí, La Selva Station (L. Garling); Santa Clara Province, Hamburg Farm (F. Nevermann); Puntarenas Province, Osa Peninsula, Corcovado (J. Longino). PANAMA: Barro Colorado Island (Brown and McCluskey; D. E. Wheeler; J. Zetek). TRINIDAD: Basin Hill Reserve (N. A. Weber) [mouthparts, sting, whole specimen]. VENEZUELA: Falcón State, near Curimagua, Haitoncito; Monagas State, Caripe; Bolívar State, Talud, south of Amarawai Tepuui and Río Akabán (J. Lattke) [2 male genitalia]. GUYANA [=British Guiana]: Oko River (N. A. Weber). BRAZIL: Amazonas State, Tefé; Manaus vicinity (W. L. Brown; K. Lenko); Pará State, Icoarcí (W. L. Brown), Belém (N. Rosa), Jacareacanga (M. Alvarenga); Mato Grosso State, Municipal Diamantino (W. L. Brown); Espírito Santo State, Linhares (M. Alvarenga). ECUADOR: Napo Province, Limoncocha (R. Chadab). PERU: Madre de Dios Department, Puerto Maldonado, Lake Sandoval (C. Kugler) [mouthparts, sting]. 93 workers, 8 queens, 4 males [BMNH, CKC, CUIC, MCZ, MIZA, MZSP, USNM].

Scandens-Group and Related Species

Rogeria scandens Mann Figs. 19-20

Macromuscha scandens Mann 1922:30, Fig. 14. Syntype workers, HONDURAS: Lombardia (Mann) [USNM] [5 of 6 syntypes examined].

Irogeria scandens; Kempf 1962a:436, 438.

Rogeria scandens; Kempf 1965:185.

Additions to *scandens*-group diagnosis. WL 0.93-1.17mm. Eye very large (about 60-80 facets). Propodeal spines long (PSI 0.25-0.28). Petiole clavate, with rather large node (PetW/PetL 0.49-0.58). Postpetiole wide (PpetW/PpetL 1.38-1.61). Mesosoma and petiolar node strongly macrosculptured. Erect hairs with dentate ends.

Workers.—TL 3.5-4.2, HL 0.83-1.02, HW 0.70-0.85, SL 0.59-0.73, EL 0.17-0.20 (60-80 facets), PW 0.53-0.62, WL 0.93-1.17, SpL 0.23-0.30, PetL 0.42-0.55, PpetL 0.23-0.27mm, CI 0.82-0.86, OI 0.21-0.24, SI 0.84-0.86, PSI 0.25-0.28. N=6

Mandible in most specimens with 5 teeth decreasing in size until large basal tooth. A denticle may appear between basal and penultimate tooth. Nuchal grooves shallow, not visible in lateral view. Metanotal groove in lateral view broad and shallow to absent; groove sometimes accentuated by a low transverse ridge at anterior of propodeum. Propodeal spines more strongly inclined in Honduran (Fig. 19) than Panamanian specimens. Metapleural lobes somewhat longer and narrower in Honduran specimens. Petiolar node slightly more distinct in Honduran specimens (Fig. 19). Sting apparatus like that of *internis* (Fig. 42), except for wider anterior apodemes and a more rounded posterodorsal corners on spiracular plates and larger anterolateral processes on the sting base (pygidium and anal plate lost in preparation).

Median clypeus with additional 1-2 pairs of fairly distinct carinulae lateral to the usual pair for the genus. Posterior head longitudinally rugose (continuing from middorsum), transversely arching rugose, or transversely rugose-areolate. Interrugal spaces on head distinctly to weakly granular; microsculpture weaker and surface shinier on posterior. Oval area on ventral half of sides of head largely smooth and very shiny. Anterior surface and neck of pronotum smooth; rest of promesonotum with widely spaced longitudinal rugae, which become vermiculate on

mesonotum. Rugae on Panamanian specimens not so vermiculate on mesonotum, and with lateral spurs. Sides of pronotum with parallel, upcurved carinae, which are more numerous and more distinct on Honduran specimens. Dorsal face of propodeum confused areolate or areolate-rugose. Intervals in mesosoma macrosculpture smooth and shiny. Petiolar node heavily areolate-rugose on sides and posterior face; sculpture weaker dorsad; no clear microsculpture. Postpetiolar node weakly rugose or rugose-areolate on sides and posterior surface, becoming weaker, sometimes absent toward midline; microsculpture vaguely microareolate to nearly smooth.

Scapes and extensor surfaces of legs without erect hair. Dorsa of head, mesosoma, nodes, and gaster T1 sparsely covered with fine appressed hair and longer, stiff, thick, erect-suberect hair with toothed apex (Fig. 20). Mandibles, clypeus and terminal segments of gaster with long erect hair that is tapered and less stiff.

Color of Honduran specimens reddish-brown. Panamanian specimens blackish-brown. Appendages often lighter.

Queen.—TL 4.2, HL 0.95, HW 0.82, SL 0.63, EL 0.22, PW 0.69, WL 1.20, SpL 0.28, PetL 0.50, PpetL 0.30mm, CI 0.86, SI 0.76, PSI 0.23. N=1

Differing from the Panamanian workers in the usual queen characteristics. Pronotum transversely rugose. Mesonotum longitudinally rugose without cross-connections or vermiculate appearance.

Discussion.—The Honduran and Panamanian specimens may be separate species. They differ slightly in shape of mesosoma and petiole, sculpture, and color, and the Honduran specimens are a little larger (WL 1.13-1.17mm) than the Panamanian specimens (WL 0.93-1.08mm). I prefer to call these geographic variants, however, until we have more specimens from more localities.

See the *terescandens* description for comparisons with its sister species.

Ecology.—Some specimens from the Canal Zone were collected from *Heliconia*.

Material Examined.—HONDURAS: Lombardia (W. M. Mann). PANAMA: Canal Zone, Barro Colorado Island (W. L. Brown and E. S. McCluskey; D. Wheeler; J. Zetek) [2 workers: mouthparts, whole specimen; sting]. 31 workers, 1 queen [CKC, LACM, MCZ, USNM].

Rogeria terescandens new species

Fig. 21

Diagnosis.—Like that of *scandens*, except: 1) Propodeal spines shorter, 2) petiolar node lower, more slender (PetW/PetL 0.40-0.41), 3) postpetiole narrower (PpetW/PpetL 1.08-1.16), and 4) macrosculpture very weak, especially on mesosoma and waist, and 5) eye slightly smaller.

Holotype and Paratype Workers.—TL 3.6, HL (0.88)-0.89, HW (0.68)-0.70, SL (0.70)-0.71, EL 0.16 (49-54 facets), PW (0.50)-0.52, WL 1.00, SpL (0.18)-0.21, PetL (0.45)-0.47, PpetL 0.25mm, CI (0.77)-0.79, OI 0.23-(0.24), SI 1.01-(1.03), PSI (0.18)-0.21. N=2.

Also differing from *scandens* in the following ways. Mandible with 6 teeth. Profile of mesosoma dorsum almost evenly convex; no metanotal groove or ridge at front of propodeum. Median carinulae on clypeus weak; no lateral carinulae. Head dorsum densely microareolate; overlain on middorsum by wisps of longitudinal rugulae, on laterodorsa by faint reticulations, and on posterior of head by fragmented, transversely arching rugulae. Microsculpture on sides and posterior head effaced. Mesosoma dorsum, including dorsal face of propodeum, densely microareolate, with superimposed patches of fine rugulose-areolate macrosculpture. Pronotal sides shiny and coriarious with some effaced longitudinal rugulae. Mesopleura and metapleura also shiny near coxae, but more opaque dorsad with microareolate and confused rugulose sculpture. Sides of petiolar node shiny, with effaced microareolate background and vestigial longitudinal rugulae. Postpetiole smooth and shiny.

Discussion.—The name of this species refers to sculpture like that of *R. scandens*, but smoother, as if rubbed (*teres* L., rubbed off).

Distribution.—Both specimens of *terescandens* were taken from trees in lowland forest on the Pacific side of Costa Rica. The holotype was collected in a two week old treefall by general collecting on trunks. The paratype was on or beneath a thick epiphyte mat on the base of a fallen branch (J. Longino unpublished field notes).

Material Examined.—**Holotype locality**. COSTA RICA: Osa Peninsula, Sirena, 8.28N 83.35W, 50m, 31-III-1982, #0950 (J. Longino) [MCZ]. **Paratype locality**. 1 worker, holotype locality, 28-V-1981, #1100 (J. Longino) [LACM].

Rogeria subarmata Kempf
Figs. 22-23

Irogeria subarmata Kempf 1962a:438, Figs. 1-4. Holotype and paratype workers, BRAZIL: Guanabara, Rio de Janeiro, Deodoro (A. Ronna) [MZSP] [12 of 38 paratypes examined; holotype not examined].

Rogeria subarmata; Kempf 1965:185.

Rogeria subarmata; Kempf 1975:367 [new records].

Additions to *scandens*-group diagnosis. WL 0.78-1.00mm. Eye with 30-53 facets. Propodeal spines short (PSI 0.09-0.12). Pygidium with a pair of median piligerous tubercles near caudal margin. Strong macrosculpture on mesosoma and petiolar node. Erect hairs not as rigid as in *scandens*; tips acute.

Workers.—TL 2.9-3.7, HL 0.69-0.87, HW 0.60-0.75, SL 0.46-0.57, EL 0.12-0.16 (30-53 facets), PW 0.45-0.57, WL 0.78-1.00, SpL 0.08-0.10, PetL 0.37-0.47, PpetL 0.20-0.26mm, CI 0.86-0.89, OI 0.20-0.23, SI 0.73-0.77, PSI 0.09-0.12. N=6

Additions to Kempf's (1962a) description. Mandibles usually with 5 teeth that decrease in size basad. Sometimes basal tooth replaced by two very small teeth, or 1-2 denticles are found between the basal and penultimate tooth. Clypeal apron weakly notched medially to evenly convex. Frontal lobes narrow as in *scandens* (Fig. 19). Nuchal grooves shallow, forming only a weak notch in lateral view. Figs. 22-23 show the range of propodeal spine size and angle, but tips sometimes more rounded. Petiole clavate to rather distinctly set off from peduncles (Figs. 22-23). Postpetiole from above much as in Fig. 21. Posterior surface of pygidium with a caudal pair of long, columnar, piligerous tubercles that are visible at 50X with a dissection microscope. Sting apparatus nearly identical to that of *inermis* (Fig. 42); sting as in *pellecta* (Fig. 33).

Median clypeus with 1-2 pair of fairly distinct extra carinulae lateral to the usual pair. Posterior head with transversely arching rugose-areolate macrosculpture. Head covered with dense, indistinctly microareolate roughening that appears punctate or granular at lower magnifications. Mesosoma dorsum longitudinally rugose; rugae with numerous lateral spurs that occasionally connect rugae on shoulders. Macrosculpture on sides of mesosoma and dorsal face of propodeum confusedly rugose to rugose-areolate. Mesosoma microsculpture as on head. Petiolar node ver-

miculate-rugose to rugose-areolate. Postpetiolar node similar, but rugae straighter, more effaced. Microsculpture on nodes slightly weaker than on head and mesosoma.

Scapes and extensor surfaces of legs lack erect hair. Rest of body with both short, appressed-decumbent and longer, erect-suberect hairs. Erect hairs are nearly as stiff as those of *scandens* and *terescandens* (Fig. 20), but seem to have acute tips.

Color dark brown to yellowish-brown with a reddish tint on mesosoma, waist and middle of gaster; appendages and ends of gaster lighter.

Distribution.—All available specimens are from localities along the coast of Brazil. The type series was collected from the stomach of an anteater (*Tamandua tetradactyla*).

Material Examined.—BRAZIL: Pará State, Belém (N. Rosa) [mouthparts, sting]; Bahia State, Itabuna (J. A. Winder); Espírito Santo State, Pedro Canário near Conceição da Barra (M. Alvarenga); Guanabara State [=Rio de Janeiro State], Rio de Janeiro, Deodoro (A. Ronna). 20 workers [MCZ, MZSP].

Rogeria procera Emery

Fig. 18

Rogeria procera Emery 1896:92, Fig. 19. Holotype worker, BRAZIL: Pará, Belém [MCSN] [Holotype examined].

Rogeria (*Irogeria*) *procera*; Emery 1915:191.

Macromischa brasiliensis Borgmeier 1953(1951):107, Figs. 1-4.

Holotype worker, BRAZIL: Pará, Rio Cuminá, Cachoeira do Breu [MZSP] [Holotype examined]. [Synonymy by Kempf 1962a:437].

Irogeria procera; Kempf 1962a:436 [partial description].

Irogeria procera; Kempf 1964:66 [partial key].

Rogeria procera; Kempf 1965:185.

Diagnosis.—WL 1.28-1.53mm. Eye very large. Propodeal spines long, not inclined. Postpetiolar node small, subconical; sternum inconspicuous and without a differentiated peduncle. Middorsum and posterior head with fine, nearly straight longitudinal rugae. Mesosoma and petiolar node with thick, vermiculate rugae. Erect hairs tapered; rarely any appressed or decumbent hairs on mesosoma dorsum, gaster, or legs. Scapes and extensor surfaces of legs with erect hairs and appressed to decumbent pilosity. Palpal formula, propodeal spiracle, metapleural lobes, petiole, pygidium, and sting apparatus as in *scandens*-group diagnosis.

Workers.—TL 4.5-5.4, HL 1.07-1.19, HW 0.91-1.08, SL 0.66-0.78, EL 0.19-0.23 (about 80-100 fac-

ets), PW 0.67-0.80, WL 1.28-1.53, SpL 0.26-0.32, PetL 0.60-0.73, PpetL 0.28-0.33mm, CI 0.85-0.91, OI 0.20-0.22, SI 0.70-0.75, PSI 0.18-0.23. N=7

Mandibles triangular with 6 teeth; basal larger than neighbor. Clypeal apron with shallow median notch. Nuchal grooves shallow, not visible in lateral view. Sting apparatus like that of *inermis* (Fig. 42), but spiracular plate with more rounded anteroventral corner and gonostylus with separate proximal and distal patches of sensilla.

Laterodorsa of head longitudinally rugose-areolate; sides below eye smooth and shiny. Microsculpture vaguely microareolate on anterior laterodorsa; more effaced on rest of head, imparting a vaguely granular, shiny appearance between rugae. Promesonotum longitudinally vermiculate-rugose. Meso- and metapleura rugose. Interrugal spaces on mesosoma and petiole almost smooth. Postpetiolar node shiny with vague rugae and weak microsculpture.

Scapes and head dorsum with erect hair and much shorter appressed to decumbent pilosity. Mesosoma, legs, waist, and gaster with erect hairs, but rarely any decumbent or appressed hairs.

Mesosoma and waist black to dark brown; appendages and sometimes gaster lighter brown.

Material Examined.—GUYANA (British Guiana): Oronoque River (N. A. Weber). BRAZIL: Pará State, Rio Cuminá (A. Sampaio), Ourém (A. Schulz); Amazonas State, Manaus (K. Lenko); Manaus to Itacoatiara (W. L. Brown) [mouthparts, sting]. 23 workers [CUIC, MCZ, MZSP].

Rogeria tonduzi Forel

Figs. 85-86

Rogeria tonduzi Forel 1899:53. Holotype worker, COSTA RICA (Tonduz) [MHN] [Holotype examined].

Irogeria tonduzi; Emery 1915:191.

Irogeria tonduzi; Kempf 1962a:436.

Rogeria tonduzi; Kempf 1965:185.

Diagnosis.—WL 0.81-0.90mm. Eye large. Palpal formula 2,2. Propodeal spiracle faces laterally. Propodeal spines long. Postpetiolar sternum not enlarged. Posterior head with transversely arching rugae. Rugae on mesosoma and petiolar node thick and rounded. Decumbent hair abundant on head dorsum and legs; little on gaster; no decumbent or appressed hair on mesosoma or nodes. Scapes, head dorsum, mesosoma, nodes and gaster with abundant flexible, tapered, erect hair; none

on extensor surfaces of legs. The following as in *scandens*-group diagnosis: metapleural lobes, petiole, pygidial gland sculpture, sting apparatus, and sculpture.

Workers.—TL 3.0-3.2, HL 0.72-0.78, HW 0.61-0.68, SL 0.48-0.53, EL 0.12-0.15 (39-48 facets), PW 0.46-0.50, WL 0.81-0.90, SpL 0.18-0.21, PetL 0.37-0.40, PpetL 0.17-0.19mm, CI 0.85-0.88, OI 0.19-0.24, SI 0.78-0.81, PSI 0.20-0.25. N=7

Mandibles triangular; most specimens with 6 teeth, the first 5 decreasing in size basad then a large basal tooth. In others, the penultimate basal is replaced by 2-3 denticles. Clypeal apron convex with median angle or small tooth. Body of clypeus rises perpendicularly. Eyes oval with narrow anterior point. Nuchal groove inconspicuous.

Pronotum in lateral view lacks a distinct angle between anterior and dorsal faces. Metanotal groove very weak to absent. Propodeal spines long, weakly inclined. Postpetiole subtrapezoidal from above; sternum flat, with a distinct peduncle. Sting apparatus like that of *inermis* (Fig. 42) except for more elongate anterolateral processes on sting bulb.

Middorsum of head longitudinally rugose; laterodorsa and dorsal part of sides rugose-areolate. Mesosoma (Figs. 85-86) with thicker rugae and narrower interrugal spaces than on head. Rugae transverse on anterior pronotum, transverse to confused on metanotum and dorsal face of propodeum, predominantly longitudinal on sides and pronotal disc. Petiolar node longitudinally rugose on sides; smooth along midline. Postpetiole smooth. Microsculpture weak or absent throughout, integument very shiny.

Scapes and head with erect to suberect hair along with the typical short decumbent pilosity. Mesosoma dorsum and waist generally with erect to suberect hair of a variety of lengths; no decumbent-appressed pilosity. Gaster with long, erect hair and a few short, decumbent hairs.

Color shiny black with dark brown mandibles, scapes and legs to reddish-brown with yellowish-brown appendages.

Discussion.—*Rogeria beltii* occurs in the same localities and could be confused with *tonduzi*, but *beltii* has a distinct petiolar node and predominantly areolate pronotal sculpture. *Rogeria lirata* (Figs. 28-30, 89-90) from northern South America is similar to *tonduzi* in size, clypeus, and sculpture, but *lirata* has smaller eyes (6-12 facets), a distinct

petiolar node, and scapes with suberect hair only.

Distribution.—With the exception of one specimen from Guatemala, all *tonduzi* specimens come from Costa Rica at elevations of 0-100m on both sides of the cordillera. Most specimens were collected by Jack Longino as strays on ground and vegetation. He found one worker in a *Cyphomyrmex* nest and another "...on the base of a small tree, amongst some *Pheidole* workers" (unpublished field notes). Lyn Garling found a nest with a "tubular entrance with white 'fuzz'" in a cacao tree (field note on label).

Material examined.

GUATEMALA (no locality or collector). COSTA RICA: Heredia Province, Puerto Viejo de Sarapiquí, La Selva Station (L. Garling); Puntarenas Province Carara Biological Reserve (P. S. Ward), Osa Peninsula, Corcovado National Park (J. Longino) [mouthparts, sting]. 24 workers [BMNH, CKC, JTLC, LACM, MCZ, MZSP, USNM].

Germaini-Group and Related Species

Rogeria germaini Emery

Figs. 24-27, 87-88

Rogeria germaini Emery 1894:189. Syntype workers, BRAZIL. Mato Grosso (Germain) [MCSN] [1 of 2 syntypes examined].

Rogeria germaini minensis Santschi 1923:1262. Lectotype and paratype workers, BRAZIL: Minas Gerais, Passa Quatro (Reichensperger) [NMB] [Both lectotype and paratype examined]. N. syn.

Rogeria germaini; Kempf 1962b:20, Figs. 18, 19 [Redescribed].

Rogeria minensis; Kempf 1963:189, Figs. 1, 2 [Redescribed, raised to species].

Additions to *germaini*-group diagnosis. WL 0.74-0.90mm. Clypeal apron with median tooth. Metanotal groove very weak or absent. Metapleural lobes reduced, not angular. Petiolar keel not lamellate. Sting shaft apex weak, lacks dorsal flange; lancets spatulate. Macrosculpture effaced on side of head below eye; sometimes nearly smooth. Promesonotal rugae sharp and narrow like those on head; rugae low on sides of pronotum do not continue onto metanotum. Macrosculpture on both nodes and petiolar peduncle vestigial. Scapes with outerect hair. Mesosoma with erect-suberect only. Head and gaster with both erect and decumbent pilosity.

Workers.— TL 2.7-3.5, HL 0.66-0.85, HW 0.59-0.74, SL 0.45-0.59, EL 0.06-0.10 (7-13 facets), PW 0.44-0.51, WL 0.74-0.90, SpL 0.15-0.21, PetL 0.30-

0.44, PpetL 0.19-0.23mm, CI 0.86-0.89, OI 0.09-0.14, SI 0.75-0.80, PSI 0.20-0.23. N=9

Additions to Kempf (1962b). Dentition variable; simplest pattern is 6 teeth of decreasing size, however, it seems that any or all of the last 3 teeth may be replaced by a pair of denticles. FLW/HW 0.32-0.36. Posterior outline of head concave to convex. Anterior propodeum marked by a transverse carina. Petiolar node distinct; Figs. 24 and 26 show extremes of shape. Postpetiolar node with a distinct posterior face; shape from above as in Figs. 24 or 32. Sting apparatus differing dramatically from that of *inermis* (Fig. 42) in some features: 1) sting shaft and lancets very weak, 2) lancets spatulate as in Fig. 29, 3) sting shaft apex with eroded sides, and no dorsal flange (Fig. 27), and 4) furcula with a shorter dorsal arm that broadly merges with the lateral arms, thus appearing broadly V-shaped in anterior view.

Posterior head transversely arching rugose to rugose-areolate. Promesonotal dorsum varies from predominantly areolate (with occasional elongate cells) (Fig. 88) to predominantly vermiculate-rugose. Pronotal sides rugose; rugae subparallel with ventral edge of pronotum to diagonal. Microsculpture vestigial, leaving irregular, but shiny spaces in macrosculpture; sides of mesosoma especially smooth.

Color brownish-yellow to brown with darker gaster; appendages at times slightly lighter.

Queen.—TL 4.1, HL 0.90, HW 0.79, SL 0.73 EL 0.17, PW 0.67, WL 1.12, SpL 0.15, PetL 0.48, PpetL 0.28mm, CI 0.88, SI 0.92, PSI 0.13. N=1

Differing from the worker in the normal queen characteristics and the following. Notch formed by nuchal groove not so distinct in lateral view. Anteroventral corner of pronotum not as clearly dentate. Parapsidal furrows not distinguishable from furrows in sculpture. Diverging rugae on middorsum of head continue onto posterior head, with few or no lateral spurs. Laterodorsa and sides of head similarly rugose. Anterior face of pronotum transversely areolate, mesonotum with longitudinal rugae diverging from an anterior point, then parallel in posterior half; some branching, but no cross-ridges; less vermiculate than in worker.

Discussion.—Kempf (1963) examined the types of *germaini* and *minensis* and noted that they were very similar, but chose to retain both names on the basis of a list of differences he saw in those speci-

mens. I have also examined the types as well as 11 specimens collected in Paraguay in 1979 and 1982. These new collections bridge the gap between the types of *germaini* and *minensis*. They are all intermediate in size between the smaller *germaini* type and the larger *minensis* types, have convex posterior heads like the *germaini* type, have promesonotal sculpture varying from nearly as extensively rugose as the *germaini* type, to areolate like the *minensis* types; and some have petiolar nodes intermediate between the more abruptly arising *minensis*-like and the more obliquely arising *germaini*-like nodes.

Rogeria lirata (Figs. 28-30, 89-90) from more northern parts of South America is *germaini*'s closest relative (See *lirata* description for comparisons). *Rogeria lacertosa* (Fig. 31), also from southern Brazil, differs in size, clypeal shape, sculpture on side of head, and pilosity. *Rogeria pellecta* (Figs. 32-33), collected further south in Brazil, differs in clypeal shape, metapleural lobes, sting, and pilosity.

Distribution.—So far *germaini* is known only from southern Brazil and Paraguay. Most specimens have come from Winkler apparatus collecting by expeditions from the MHN in Geneva. Specimens were extracted from rotting leaf litter and wood in forests.

Material Examined.—BRAZIL: Minas Gerais State, Passa Quatro (Reichensperger); Mato Grosso State; São Paulo State, Anhembí [=Pirambóia, 29km E Botucatu] (Kempf et al.). PARAGUAY: Alto Paraná Province, Puerto Santa Teresa; Misiones Province, Panchito Lopez; Itapúa Province, San Benito Island [2 workers: whole specimen; mouth-parts, sting]; Itapúa Province, Santa María; Central Province, Asunción (F. Baud et al.). 15 workers, 1 queen [BMNH, CKC, MCSN, MCZ, MHN, NMB].

Rogeria lirata new species

Figs. 28-30, 89-90

Diagnosis.—As in *germaini* but: 1) metapleural lobes larger, triangular, and 2) rugae on promesonotum more rounded and thicker than on head; one ruga begins near anteroventral corner of pronotum and continues unbroken to the metanotum.

Holotype and Paratype Workers.— TL 2.6-3.4 (3.3), HL 0.63-0.80 (0.78), HW 0.53-0.70 (0.67), SL 0.45-0.56 (0.55), EL 0.05-0.08 (0.08) (6-12 facets),

PW 0.39-0.51 (0.51), WL 0.65-0.87 (0.86), SpL 0.12-0.20 (0.175), PetL 0.31-0.47 (0.44), PpetL 0.17-0.23 (0.21) mm, CI 0.83-0.88 (0.86), OI 0.09-0.12 (0.12), SI 0.79-0.85 (0.82), PSI 0.19-0.23 (0.20). N=10

Dentition as in *germaini*. Nuchal groove forms a weak notch in lateral view. No clear angle between anterior and dorsal faces of pronotum. Spiracle faces slightly caudad, posterior edge within one diameter of nearest edge of propodeum. Petiolar peduncle with a sharp, but not lamellate keel. Petiolar node profile angular. Postpetiolar node in dorsal view shaped as in Figs. 24 or 49; sternum flat. Sting apparatus as described for *germaini*.

Divergent longitudinal rugae on frontal lobes grade into areolate sculpture at level of eyes. Sculpture of posterior head transversely arching rugose to rugose-areolate. Laterodorsa and sides of head longitudinally rugose-areolate; sides may be effaced to nearly smooth. Head microsculpture vestigial; intervals nearly smooth, quite shiny. Anterior face of pronotum areolate, becoming vermiculate-rugose on disc (Fig. 90). Thick, rounded rugae of promesonotum may merge, but are rarely joined by cross-ridges. Rugae on meso- and metapleura sharper and more separated. Anterior and dorsal faces of petiolar node smooth. Sides and posterior faces of node in holotype longitudinally rugose-areolate, but weaker and more rugose in Trinidad specimen and nearly smooth in specimens from Peru. Microsculpture weak or absent; integument shiny.

Scapes with decumbent to suberect hair (holotype) or with short, uniformly subdecumbent hair. Head dorsum with subdecumbent to erect hair.

In most, mandibles, frontoclypeal region, antennae and legs brownish-yellow; other parts rusty-brown, becoming darker, almost black, on dorsa of mesosoma and petiole. Trinidad and Guyana specimens lighter on all parts.

Queens.—TL 3.6-3.7, HL 0.76-0.80, HW 0.69-0.70, SL 0.52-0.57, EL 0.14-0.15, PW 0.58-0.60, WL 0.95-1.00, SpL 0.18-0.20, PetL 0.46-0.52, PpetL 0.23-0.24 mm, CI 0.88-0.90, SI 0.76-0.81, PSI 0.18-0.21. N=4.

Besides the usual features of an alate female, differing from the worker in the following ways. Mandible with 7 teeth or 3 teeth and 5 denticles. Parapsidal furrows not distinct from furrows in sculpture. Propodeal spines project caudad or posterovertrad. Rugae on sides of pronotum almost vertical to shoulder, then bend across the

anterior face of the pronotum. Mesonotal rugae longitudinal with occasional fusions and cross-ridges. Wing venation (Fig. 30) most similar to that of *stigmatica*. Radial sector and median veins long, nearly reaching wing margin; r-m vein present.

Discussion.—See the *tonduzi* discussion for comparisons with that species. The name *lirata* refers to the characteristic rugae of the mesosoma, which resemble the ridges thrown up by a plow.

Material Examined.—**Holotype locality.** COLOMBIA: 7km N Leticia, forest litter, 10-25-II-1972, #B-230 (S. and J. Peck) [MCZ].

Paratype localities. TRINIDAD: 3 workers, #191 (N. A. Weber) [MCZ, MZSP]; 1 worker, Mayaro, Trinity Hills Reserve, 5-VIII-1976 (J. Noyes) [BMHN]. GUYANA (British Guiana): 1 worker, R. Mazaruni Forest Settlement, 20-VIII-1935, #304 (N. A. Weber) [MCZ]. COLOMBIA: 2 workers, holotype locality [mouthparts, sting; one coated for electron microscopy] [CKC, MCZ]. PERU: 2 workers, Loreto Department, 15km WSW Yurimaguas, 5.59S 76.13W, 200m, 22-VII-1986, #8701-24 and #8701-25 (P. S. Ward) [mouthparts, sting] [LACM, MCZ].

Nontype localities. TRINIDAD: 1 queen, Nariva Swamp, 23-IV-1935, #140 (N. A. Weber) [MCZ]. BRAZIL: 3 queens, Mato Grosso State, Sinop, 55.37W 12.31S, X-1974 #12314 (Alvarenga), #12576 (Alvarenga and Roppa) [MZSP]; 2 queens, Goiás State, Jataí, XI-XII-1972, #8857, #8939 (F. M. Oliveira) [MZSP].

Rogeria lacertosa Kempf

Fig. 31

Rogeria lacertosa Kempf 1963:194, Figs 5-6. Holotype and paratype workers, BRAZIL: Rio Grande do Sul State, Sinimbu (F. Plaumann) [MZSP] [All 4 paratypes examined; holotype not examined].

Additions to *germaini*-group diagnosis. WL 0.93-1.05mm. Clypeal apron with median notch. Metanotal groove weak to strong. Petiolar keel with single lamellate carina. Sting shaft apex has dorsal flange; lancets acute; both weak. Macrosculpture not effaced on side of head below eye. Promesonotal rugae sharp and narrow like those on head. Sides of both nodes distinctly macroareolate. Erect hairs on scapes. No decumbent hair on gaster; little if any on mesosoma dorsum.

Workers.—TL 3.6-4.0, HL 0.83-0.91, HW 0.72-

0.81, SL 0.59-0.61, EL 0.10-0.11 (19-20 facets), PW 0.52-0.60, WL 0.93-1.05, SpL 0.17-0.20, PetL 0.43-0.45, PpetL 0.23-0.26mm, CI 0.87-0.88, OI 0.13-0.14, SI 0.75-0.79, PSI 0.18-0.20. N=4

The following supplements Kempf (1963). All specimens at hand with 6 mandibular teeth decreasing in size basad, except for a large basal tooth. Eyes elliptical. Nuchal groove forms a notch in lateral view of head. Anterior edge of propodeum not marked by a transverse carina. Metapleural lobes low and broadly rounded or triangular with more narrowly rounded apex. Postpetiolar node from above like that of *pellecta* (Fig. 32). Sting apparatus as *internis* (Fig. 42), but sting shaft and lancets are less sclerotized (easily twisted) and the lancets lack the barbule.

Laterodorsa of head predominantly rugose to rugose-areolate. Back of head areolate in a transversely arched pattern. Microsculpture vestigial; intervals with a shiny, effaced granular appearance. Anterior face of pronotum transversely areolate; disc with diverging, longitudinal, vermiculate rugae with variable number of cross-ridges imparting a rugose-areolate appearance in places. Sides of mesosoma predominantly longitudinally rugose, but with occasional cross-ridges making elongate cells. Intervals in mesosoma macrosculpture shiny, nearly smooth, especially on sides. Anterior and sometimes dorsal faces of nodes weakly sculptured. Nodes slightly dulled by vestigial microsculpture.

Head dorsum with erect-suberect hairs in addition to the typical decumbent pilosity.

Color yellowish-brown; gasters slightly darker. Legs and, sometimes, antennae lighter, more yellowish. Mandibles often slightly darker than head capsule.

Discussion.—Because *minensis* has been synonymized with *germaini*, some of Kempf's (1963) list of characters that distinguish *lacertosa* are no longer valid, however, *germaini* and *lacertosa* are still distinguishable on the basis of a number of characters (see *germaini* discussion). *Rogeria pellecta* (Figs. 32-33), also from southern Brazil, differs in petiole keel, sting and lancets, promesonotal sculpture, and pilosity.

Distribution.—*Rogeria lacertosa* is known only from the type material collected from 100-200m elevation in southern Brazil. No ecological data are available.

Material Examined.—BRAZIL: Rio Grande do

Sul State, Pardinho (F. Plaumann), Sinimbu (F. Plaumann) [mouthparts, sting]. 4 workers [MZSP].

Rogeria pellecta Kempf
Figs. 32-33

Rogeria pellecta Kempf 1963:191, Figs. 3-4. Holotype worker, BRAZIL: Santa Catarina State, Nova Teutônia (F. Plaumann) [MCZ, MZSP] [6 of 28 paratype workers examined, including 4 from holotype locality; holotype not examined].

Diagnosis.—WL 0.90-0.99mm. Clypeus with median notch. Metanotal groove distinct. Metapleural lobes prominent, triangular. Petiolar node arises gradually from peduncle. Sting and lancets strong, acute; sting shaft with dorsal flange; lancet with barbule. Laterodorsa of head longitudinally rugose. Promesonotum coarsely areolate to rugose-areolate. Back of petiolar node strongly areolate; postpetiole vestigially areolate. Scapes lack erect hair. Dorsa of head, mesosoma, nodes and gaster with erect and decumbent pilosity. Mandibles, palpal formula, eye, propodeal spines, postpetiole, other aspects of petiole, sculpture, and pilosity as in *germaini*-group diagnosis.

Workers.—TL 3.4-3.7, HL 0.81-0.89, HW 0.71-0.78, SL 0.55-0.60, EL 0.09-0.11 (16-21 facets), PW 0.50-0.55, WL 0.90-0.99, SpL 0.17-0.21, PetL 0.39-0.46, PpetL 0.20-0.22mm, CI 0.87-0.88, OI 0.12-0.14, SI 0.77-0.79, PSI 0.19-0.22. N=6

The following supplements Kempf (1963). Palpal formula 3,2. Anterior edge of clypeus weakly emarginate. Eyes oval. Metanotal groove may be bordered behind by a transverse costa. Posterior face of petiolar node vertical or slightly concave in lateral view. Postpetiole widest anteriorly, as in Fig. 32, or evenly convex, as in Fig. 53. Sting apparatus like that of *inermis* (Fig. 42), except for the sting (Fig. 33), which has larger anterolateral processes on sting base, a stronger, relatively thicker sting shaft, and a lower dorsal flange.

Posterior head sculpture is rugose-areolate, with rugae longitudinally diverging or transversely arching across back of head. Rugae of laterodorsa sometimes broken and with lateral spurs. Sides of head areolate around eye, but effaced and nearly smooth ventrad. Dorsal face of propodeum transversely carinulate to coarsely areolate. Petiolar node with areolate macrosulpture that becomes weaker and less defined anteriorly. Ventral petiole with a pair of longitudinal carinae arising from an anterior keel. Head and mesosoma

microsculpture vestigial, leaving nearly smooth, shiny intervals in macrosulpture. Sides of petiolar peduncle microareolate; nodes roughened by obscure macrosulpture and not as shiny as head and mesosoma.

Color yellowish-brown; gaster slightly darker. Legs, and sometimes antennae, lighter, more yellowish. Mandibles often slightly darker than head capsule.

Gynecoid Workers.—As described by Kempf (1963).

Discussion.—In the southern Brazil/Paraguay area occur related species *germaini*, *lacertosa*, and *sicaria*. Comparisons with these species are found in the "Species Groups" section and in the *germaini* and *lacertosa* discussions.

Distribution.—*Rogeria pellecta* is known only from the 33 type specimens taken in southern Brazil from berlesate of leaf litter.

Material Examined.—BRAZIL: Santa Catarina State, Nova Teutônia (F. Plaumann) [mouthparts, sting]. 6 workers, 1 gynecoid [MCZ, MZSP].

Rogeria sicaria Kempf
Fig. 34

Rogeria sicaria Kempf 1962b:22, Figs. 20, 21. Holotype worker, BRAZIL: São Paulo, Agudos [19km SSE Bauru] (W. W. Kempf) [MZSP] [Holotype examined].

Diagnosis.—WL 0.75mm. Eye very small. Clypeal apron convex. Metanotal groove strong. Propodeal spines very long, strongly inclined dorsad and divergent. Petiole long (PetL/PW 0.95), with prominent keel. Sting apex strong, with dorsal flange. Sides of head below eye, mesosoma, and petiolar node areolate; coarsely so on mesosoma. No erect hair on scapes. Head, mesosoma dorsum, nodes, and gaster T1 with stiff, erect-suberect hairs and shorter, more abundant, appressed-decumbent hair.

Holotype Worker.—TL 2.8, HL 0.67, HW 0.56, SL 0.48, EL 0.03 (8 facets), PW 0.37, WL 0.75, SpL 0.22, PetL 0.35, PpetL 0.17mm, CI 0.83, OI 0.05, SI 0.86, PSI 0.29.

The following supplements Kempf (1962b). Mandible triangular, with 5 teeth decreasing in size to base. Clypeal apron evenly convex; body of clypeus projecting over mandibles. Frontal lobes narrow (FLW/HW 0.29). Eyes small, circular, somewhat sunken in head. Petiolar peduncle long (PetL/PW 0.95), with strong keel and dentate

inferior process. Postpetiole highest in caudal half; dorsal view subtrapezoidal as in Fig. 49.

Posterior head areolate and more coarse than elsewhere on head. Intervals shiny, but dulled somewhat by vestigial microsculpture. Areolate sculpture on petiolar node not as well defined as on head and mesosoma and even more effaced on postpetiolar node. Nodes roughened by vague microsculpture.

Color uniformly golden-brown.

Discussion.—This species is still known only from the holotype. It seems related to *germaini*, *pellecta*, and *lacertosa*, also from southern Brazil. See the "Species Groups" section for comparisons.

Creightoni-Group and Related Species

Rogeria merenbergiana new species

Figs. 46-48

Additions to *creightoni*-group diagnosis. WL 0.69-0.83mm. Palpal formula 3,2. Clypeal apron with median concavity. Eye small, elliptical; EL/SpL 0.67-0.86. Anterior edge of pronotal disc without a strong transverse carina. MHI 0.91-1.01. Promesonotum and metanotum with distinct profiles—promesonotum convex, metanotum usually flat. Propodeal spines short, straight. Postpetiole from above subtrapezoidal. Mesosoma and sides of head rugose (sides of head sometimes effaced rugose-areolate). Erect hair on scapes and middle and hind tibiae.

Holotype and Paratype Workers.—TL 2.7-3.1 (3.0), HL 0.69-0.71 (0.71), HW 0.57-0.62 (0.61), SL 0.46-0.52 (0.50), EL 0.07-0.09 (0.08) (8-14 facets), PW 0.42-0.47 (0.45), WL 0.74-0.83 (0.80), SpL 0.10-0.14 (0.12), PetL 0.28-0.36 (0.335), PpetL 0.15-0.18 (0.16)mm, CI 0.83-0.88 (0.85), OI 0.13-0.15 (0.13), SI 0.80-0.84 (0.83), PSI 0.13-0.17 (0.15), MHI 0.91-1.00 (0.93). N=6

Mandibles with 6-7 teeth decreasing in size basad and basal tooth as large or larger than penultimate basal. If 6 teeth, may have 1-2 additional denticles among basal teeth. Body of clypeus not strongly produced. Nuchal groove weak. Posterior outline of head evenly convex. Propodeal spiracle one diameter, or slightly less, from edge of infradental lamella. Metapleural lobes low; edges perpendicular. Petiolar node with a more or less distinct angle between dorsal and posterior faces. Petiolar peduncle with weak keel. Postpetiole with

longer anterior face and short posterior face meeting at a narrow apex. Postpetiolar node from above as in *unguispina* (Fig. 49). Postpetiolar sternum short, weakly concave; anterior edge square.

Laterodorsa of head longitudinally rugose-areolate. Posterior head with rugae diverging from midline or transversely arching; few if any cross ridges. Sides of head longitudinally rugose. Anterior pronotal disc transversely rugose to rugose-areolate; rest of promesonotal dorsum longitudinally rugose. Dorsal face of propodeum areolate-rugose. Lateral mesosoma rugose; less regularly so on meso- and metapleura. Microsculpture on head and mesosoma effaced; intervals quite smooth and shiny, especially on sides and back of head. Petiole distinctly microareolate; sides of node vaguely rugose to vaguely areolate; posterior face with strong ridges. Postpetiole effaced microareolate and very sparsely and vaguely rugose.

Color very dark reddish brown to yellowish brown; appendages and often sides of mesosoma and gaster lighter.

Nontype Workers.—TL 2.6-3.0, HL 0.63-0.71, HW 0.53-0.60, SL 0.43-0.49, EL 0.08-0.09 (12-15 facets), PW 0.40-0.43, WL 0.69-0.77, SpL 0.10-0.13, PetL 0.29-0.33, PpetL 0.16-0.18mm, CI 0.84-0.85, OI 0.14-0.15, SI 0.79-0.82, PSI 0.14-0.17, MHI 0.95-1.01. N=3

Little difference from types. Some slightly smaller, but with slightly larger eye for size. Generally higher mesosoma height index. Posterior head sometimes transversely arching rugose-areolate. Sides of head rugose-areolate, but effaced posterior to eye. Promesonotal dorsum longitudinally rugose to rugose-areolate. Lateral mesosoma rugose-areolate.

Paratype And Nontype Queens.—TL 3.3-3.7, HL 0.70-0.75, HW 0.61-0.64, SL 0.48-0.52, EL 0.16-0.17, PW 0.58-0.60, WL 0.98-1.15, SpL 0.15-0.17, PetL 0.34-0.39, PpetL 0.19-0.20mm, CI 0.86-0.88, SI 0.78-0.80, PSI 0.14-0.16, MHI 1.13-1.19. N=3

Mandible with 6-7 teeth; if 6, basal larger than penultimate tooth. Clypeus evenly convex to weakly emarginate. Posterior outline of head strongly convex. Mesosoma and waist habitus shown in Fig. 48. Sculpture mostly like worker. Anterior pronotum areolate, becoming more rugose on sides. Half to nearly all of ventral half of mesopleura smooth; the rest of meso- and metapleura and meso- and metanota longitudi-

nally rugose-carinate. Dorsal face of propodeum transversely rugose. Intervals on mesosoma nearly smooth; shiny. Petiole and postpetiole more strongly microareolate and weakly areolate.

Discussion.—*Rogeria unguispina* (Fig. 49) from the mountains of Venezuela (1100-2000m) is also very similar in size, sculpture, pilosity and color to *merenbergiana*, and the two species intergrade with respect to mesosoma shape and petiole shape. It is quite possible that these are geographic variants of the same species, but all *unguispina* specimens presently available have more elongate eyes and have a strong carina running across the shoulders, and specimens dissected differ in palpal formula. Most *unguispina* specimens also have downcurved propodeal spines, concave posterior face of petiolar node, and a broad, shallow metanotal groove. See also the *nevadensis* discussion for comparisons with that species from high elevations in Colombia.

Rogeria alzatei occurs in Colombia, but so far has not been found above 1000m. These ants are usually smaller than *merenbergiana* (WL 0.51-0.68mm), lack erect hair on the scapes, and lack a distinct metanotal profile.

Rogeria creightoni, so far only known from North and Central America, is related to *merenbergiana*, but generally has: 1) longer, less inclined propodeal spines, 2) less distinct metanotum, and 3) stronger, rugose-areolate sculpture on sides of head (Figs. 51-54, 95-96).

Rogeria belti from Central America is the same size and also generally has a more or less definite step in mesosoma profile at metanotal groove, but has: 1) larger eye, 2) longer propodeal spines, 3) more rounded postpetiolar node, 4) more areolate pronotum, and 5) mesosoma dorsum without two distinct types of hairs.

This species is named in honor of Gunther Buch and his family, who have heroically maintained part of their farm, Finca Merenberg, as a nature preserve and permitted the collection of these and other ants.

Distribution.—*Rogeria merenbergiana* is found at high elevations (1300-2300m) in the Andes of Ecuador and southern Colombia. It has been taken in litter samples in moist broadleaf forest and bamboo-moss forest. A nest was found in a rotten log in a pasture.

Material Examined.—**Holotype locality.** COLOMBIA: 14 workers, 1 queen, Huila, 12km W

Belén, Santa Leticia, Finca Merenberg, 2300m, 9-13-I-1978, rotten log in pasture (C. Kugler and J. Hahn) [1 mouthparts; 4 stings] [MCZ].

Paratype localities. COLOMBIA: 13 workers, 1 queen, holotype locality [BMNH, LACM, MCZ, MZSP, USNM]; 2 workers, Huila, Las Cuevas de los Guacharos National Park, 1900-2300m, near Palestina, about 20km S Pitalito, 15-17-I-1978 (C. Kugler and J. Hahn) [whole specimen slide mounted] [MCZ].

Nontype localities. ECUADOR: 2 workers, Pichincha Province, 16km E Tandapi, 2000m, in litter, 20-VI-1975, B-302 (S. and J. Peck); 3 workers, 2 queens, Pichincha Province, 3km E Tandapi, 1300m, litter in wet ravine, VI-1975 (S. and J. Peck); 4 workers, Pichincha Province, 20-30km ENE Alluriquin on Chiriboga Road, 1400-1800m, 1975, B-301 (S. and J. Peck) [CKC, MCZ].

Rogeria unguispina new species

Fig. 49

Additions to *creightoni*-group diagnosis. WL 0.64-0.83mm. Palpal formula 2,2. Clypeal apron with median concavity. Eye moderately large, elongate-oval. Strong carina across shoulders. Metanotal groove broad and shallow. Propodeal spines usually with downcurved tips. Postpetiole from above subtrapezoidal. Sculpture on side of head vestigial, leaving a small or extensive smooth area. Pronotal disc and sides with weakly undulating rugae and nearly smooth, shiny interrugal spaces. Erect-suberect hair on scapes, and middle and hind tibiae.

Holotype and Paratype Workers.— TL 2.4-3.1 (3.0), HL 0.60-0.72 (0.71), HW 0.50-0.61 (0.60), SL 0.40-0.49 (0.47), EL 0.10-0.11 (0.11) (15-19 facets), PW 0.36-0.46 (0.46), WL 0.64-0.83 (0.81), SpL 0.09-0.13 (0.13), PetL 0.26-0.34 (0.34), PpetL 0.14-0.19 (0.19)mm, CI 0.82-0.86 (0.84), OI 0.12-0.16 (0.13), SI 0.79-0.82 (0.78), PSI 0.14-0.16 (0.15). N=7

Mandibles with 5-6 teeth, basal larger than penultimate tooth; some with a denticle between basal and penultimate teeth. Body of clypeus not projecting over apron. Nuchal groove makes a notch in side of head. Pronotum rounded on front and sides. Propodeal spiracle large (Fig. 49) to moderate; less than one-half diameter from nearest edge of propodeum. Free edges of metapleural lobes form an oblique angle. Posterior face of petiole concave in holotype and some paratypes.

Petiolar peduncle lacks a distinct keel. Postpetiolar node highest in posterior half. Postpetiolar sternum with a short, flat profile and square anterior corner.

Laterodorsa of head rugose, sometimes areolate caudad (holotype). Posterior head rugose-areolate in a more or less transversely arching pattern. Interstices on head vaguely roughened by effaced microsculpture; especially shiny on sides and back of head. Mesonotal dorsum longitudinally rugose in front, becoming more vermiculate with partial or complete cross-ridges behind. Pronotal sides longitudinally rugose with few cross-ridges. Meso- and metapleura with broken, irregular macrosculpture. Dorsal face of propodeum transversely areolate. Interstices on disc and sides of pronotum shiny, nearly smooth; rest of mesosoma vaguely microareolate and quite shiny. Petiolar node weakly to vestigially microareolate; posterior face of node with longitudinal carinulae. Postpetiolar node nearly covered with vague microsculpture to nearly smooth; always weaker than on petiole. Color blackish-brown with yellowish-brown mandibles, flagellum of antennae, legs, and terminal segments of gaster.

Discussion.—*Rogeria nevadensis* is a similar ant from the mountains of northeastern Colombia, but *nevadensis*: 1) is usually smaller, 2) has smaller eyes, 3) has straight propodeal spines, 4) has more effaced sculpture, and 5) lacks erect hair on the scapes and tibiae. See also the *merenbergiana* discussion.

The name *unguispina* refers to the claw-like shape of the propodeal spines.

Distribution.—So far, *unguispina* is known only from Venezuelan rain forest between 200m and 2000m elevation.

Material Examined.—**Holotype locality.** VENEZUELA: Miranda state, Río Capaya at Quebrada El Bagre, near Salmerón, E of Caracas, 200m, nest beneath log on forest floor in limestone gorge, 8-II-1982, #238 (J. Lattke) [MCZ].

Paratype localities. VENEZUELA: 9 workers, holotype locality [mouthparts, sting] [BMNH, CKC, LACM, MCZ, MZSP, USNM]; 1 worker, Falcón State, Sierra de San Luis [mountain range just south of Paraguaná Peninsula], Haitoncitos, near Curimagua, 1180m, primary forest, 3-VIII-1982, #271 (J. Lattke) [MCZ]; 1 worker, Aragua State, Rancho Grande, 15-VI-1960, 4563a (J. Ojasti)

[MCZ]; 1 worker, Aragua State, Rancho Grande, 14-VIII-1967, 1100m (R. W. Poole) [MCZ]; 2 workers, Lara State, vicinity of Caspo, 18km S Sanare, 1620m, forest rotten wood, 6-XII-1985 (J. Lattke and W. L. Brown) [MIZA].

Rogeria brunnea Santschi

Figs. 50, 93

Rogeria curvipubens brunnea Santschi 1930:79. Syntype workers, CUBA: Pinar del Río, Sierra de los Organos, Rángel (A. Bierig) [NMB] [Both syntypes examined]. N. **comb.** *Rogeria scabra* Weber 1934:27, Fig. 2. Syntype workers, queen, CUBA: Cienfuegos, Soledad, Limones Seboruco (Darlington and Weber) [MCZ] [Queen and 1 of 2 worker syntypes examined]. N. **syn.**

Rogeria caraiba Santschi 1936:198, Fig. 5. Syntype workers, CUBA: Habana, Playa de Marianao [NMB] [All 8 syntypes examined]. N. **syn.**

Rogeria cubensis Santschi 1936:199, Figs. 3-4. Holotype worker, CUBA: Pinar del Río, Sierra del Rosario (A. Bierig) [NMB] [Holotype examined]. N. **syn.**

Rogeria cubensis habanica Santschi 1936:200. Holotype worker, CUBA: Playa de Marianao (Bierig) [NMB] [Holotype examined]. N. **syn.**

Additions to *creightoni*-group diagnosis. WL 0.61-0.91mm. Clypeal apron convex. Eye small, elliptical. Nuchal groove weakly visible in lateral view. MHI 0.84-0.99. Pronotal shoulders well rounded. Propodeal spines straight, inclined. Propodeal spiracle less than 1 diameter from edge of infradental lamella. Postpetiole long (PpetL/PW 0.42-0.49), subtrapezoidal in dorsal view; sternum with long, flat profile and receding anterior edge (except Dominican Republic). Both macro- and microsculpture weak overall (stronger in Dominican Republic). Rugae fine, low on head and mesosoma (Fig. 93); vestigial on petiole. Erect hair sometimes sparse and only slightly longer than decumbent hair. Scapes have erect hairs; extensor surfaces of legs do not.

Workers.—TL 2.3-3.3, HL 0.57-0.80, HW 0.45-0.70, SL 0.36-0.52, EL 0.06-0.09 (9-18 facets), PW 0.35-0.49, WL 0.61-0.91, SpL 0.09-0.15, PetL 0.25-0.34, PpetL 0.15-0.22mm, CI 0.79-0.87, OI 0.12-0.16, SI 0.73-0.89, PSI 0.15-0.17, MHI 0.84-0.94. N=16

Mandibles with 5-7 teeth; basal tooth equal to or slightly larger than penultimate basal; a denticle may occur between basal teeth. Body of clypeus not projecting over apron. Posterior outline of head convex to weakly concave. Mesosoma with broadly rounded shoulders; metanotal groove

a weak impression or absent; no ridge at anterior of propodeum. Propodeal spines narrow, moderately long; a bisecting line passes dorsal to propodeal spiracle and through or below anteroventral corner of pronotum. Metapleural lobes low, angular. Petiolar peduncle with strong keel; node large and somewhat bulbous. Postpetiolar node with long, low profile and weakly defined posterior and anterior faces (more distinct in Dominican Republic).

Laterodorsa and sides of head rugose-areolate; in most Cuban specimens ridges become very weak on sides, even absent in spots. Posterior head with transversely arching rugose-areolate macrosculpture. Anterior pronotal disc transversely rugose to rugose-areolate; rest of pronotum longitudinally rugose, usually with incomplete cross-ridges between rugae. Mesonotum more rugose-areolate. Pronotal sides basically rugose (areolate-rugose in Dominican Republic); meso- and metapleura confused rugose-areolate with some smooth patches. Dorsal face of propodeum transversely rugose. Vague rugosities on sides and/or posterior petiolar node; postpetiolar node smooth.

Color brown to yellowish-brown, with lighter, more yellowish appendages and frontoclypeal region.

Queens.—TL 2.8-3.4, HL 0.59-0.74, HW 0.52-0.65, SL 0.39-0.50, EL 0.11-0.15, PW 0.45-0.52, WL 0.81-0.95, SpL 0.10-0.16, PetL 0.26 (estimated)-0.40, PpetL 0.17-0.22mm, CI 0.86-0.89, SI 0.74-0.78, PSI 0.13-0.16, MHI (Cuban only; could not measure in Bahamian) 0.97-1.06. N=3

Apparently collected as strays, so not definitely associated with workers described above. The Bahamian queen distinctly smaller (all of the smallest measurements above); Cuban queens nearly identical in size. Mandible with 6 teeth; basal and penultimate tooth subequal in size. Clypeus evenly convex. Posterior outline of head medially concave. Mesosoma of Cuban queens robust, shaped like that of *scobinata* (Fig. 62), but larger and with more prominent, angular metapleural lobes. Mesosoma of Bahamian queen seems like that of Cuban queens, but is obscured by legs. Waist as in workers, except for lack of keel

on the petiolar peduncle in Cuban specimen. PpetW/PpetL 1.05-1.14. Sculpture much as in workers. Macrosulpture on sides of head weak. Most of ventral half of mesopleura smooth. Pilosity and color as in workers.

Discussion.—Workers of this species have two disjunct sizes. In the smaller size range (WL 0.62-0.70mm) are three specimens from Pinar del Río Province (including *brunnea* syntypes), one from Soledad (*scabra* syntype), one from I. Pinas, three from Dominican Republic, and one from Bahamas. The larger workers (WL 0.80-0.91mm) are from Sierra del Rosario (*cubensis* holotype), Soledad, Playa Marianao (*habanica* holotype), Sierra Maestra, and Sierra Anale. Aside from size, the smaller workers show little consistent difference from the larger workers, and in ways that often vary within *Rogeria* species: 1) slightly more macrosulpture on petiolar node, and 2) slightly more extensive microareolate sculpture on sides of mesosoma. The specimens from Dominican Republic differ from the rest in having a more compact mesosoma, more distinct postpetiolar node and sternum in side view, and slightly stronger sculpture.

Workers of *creightoni* from San José, Costa Rica have the same size as larger *brunnea* and much the same pilosity, nuchal groove, and shape of mesosoma and petiole. *Rogeria creightoni* specimens from Yucatán and Chiapas have size, eye size, postpetiole, and pilosity like the larger *brunnea*, and the Yucatán specimen has similar mesosoma shape. But *brunnea* workers can be distinguished by the combination of characters in the diagnosis.

Material Examined.—CUBA: Pinar del Río Province, Sierra de los Organos, Sierra del Rosario (Bierig), Las Acostas (E. O. Wilson), San Vincente (E. O. Wilson); Habana Province, Playa Marianao (Bierig); Cienfuegos Province, Soledad (P. J. Darlington; N. A. Weber; E. O. Wilson; D. Bates and G. Fairchild); Las Villas Province, Caibarién (E. O. Wilson); Sierra Anale (Bierig); Sierra Maestra, Uvero (L. Armas). I. Pinas, S. Casas (L. B. Zayas). DOMINICAN REPUBLIC: 16km ENE Pedernales (P. S. Ward). BAHAMAS: Andros Island, Nassau Island (W. M. Wheeler). 20 workers, 3 queens [LACM, MCZ, NMB].

Rogeria creightoni Snelling
Figs. 51-54, 95-96

Rogeria creightoni Snelling 1973:2, Fig. 1. Holotype and paratype worker, UNITED STATES: Texas, Cameron County, La Feria (W. S. Creighton) [LACM] [Holotype and paratype examined].

Additions to *creightoni*-group diagnosis. WL 0.63-0.93mm. Clypeal apron usually with weak to distinct median notch. Eyes small, oval to circular (EL/SpL 0.29-0.64). Metanotal groove weak or absent. MHI usually 0.90-1.06. Propodeal spines long (PSI usually > 0.17), often nearly horizontal. Postpetiolar node from above usually subtrapezoidal, sometimes subrectangular; anterior edge of sternum not prominent. Sides of head distinctly rugose-areolate. Pronotal disc transversely rugose-areolate on anterior edge and longitudinally rugose-areolate behind (Fig. 96). Scapes and extensor surfaces of tibiae with erect-suberect hairs.

Workers.— TL 2.4-3.5, HL 0.58-0.81, HW 0.51-0.72, SL 0.38-0.55, EL 0.05-0.10 (8-16 facets), PW 0.37-0.52, WL 0.63-0.93, SpL 0.11-0.20, PetL 0.27-0.40, PpetL 0.14-0.22mm, CI 0.85-0.91, OI 0.08-0.17, SI 0.68-0.80, PSI 0.16-0.28, MHI 0.87-1.08. N=21

Mandibles with 5-7 teeth, if 5, may have 1-2 additional basal denticles. Basal tooth subequal or larger than penultimate basal. Palpal formula 3,2. Body of clypeus projecting to anterior edge of apron or beyond. Nuchal groove weak to strong. Posterior margin of head weakly concave to convex. Mesosoma habitus variable (Figs. 51-53). Propodeal spines moderately long and angled to very long and nearly horizontal, a bisecting line usually passes well above anteroventral corner of pronotum. Propodeal spiracle not especially large or prominent; located < 1/2 diameter to almost one diameter from edge of infradental lamella. Metapleural lobes moderately to very prominent; corner broadly to narrowly rounded. Petiolar node more or less distinct (Figs. 51, 53). Petiolar keel absent to moderately well developed. Sting apparatus of specimens from four localities like that of *inermis* (Fig. 42), except for less angular anteroventral corner of spiracular plate, somewhat lower valve chamber height, and in Belize and Oaxaca specimens the sting shaft is higher and slightly upturned.

Laterodorsa of head longitudinally rugose to

areolate; posterior head transversely arched areolate-rugose. Pronotal sides longitudinally rugose to areolate-rugose; meso- and metapleura confused rugose (Fig. 95). Dorsal face of propodeum marked anteriorly by a distinct transverse carina, then areolate and/or transversely rugose. Head and mesosoma microsculpture obscure; intervals in macrosculpture moderately shiny. Top and sides of petiolar node effaced microareolate with very weak, indistinct macrosculpture; posterior face with weak longitudinal rugulae. Postpetiolar node with vague microsculpture on sides; smooth dorsally.

Color brownish-yellow to brownish-yellow; dorsa of head and gaster slightly darker, appendages lighter.

Queen.— Uncertain; see discussion.

Discussion.—This species becomes quite heterogeneous with this revision. Ants from almost every locality are different from the others in some conspicuous way. Specimens from Belize have the longest propodeal spines (PSI 0.24-0.28), more prominent metapleural lobes, weak or absent petiolar keel and thicker ridges in macrosculpture. The Texas specimens have similar habitus, but have somewhat shorter propodeal spines (PSI 0.21-0.23), less prominent metapleural lobes, more distinct petiolar keel and less thickened macrosculpture. A Tamaulipas specimen is similar to the Texas specimens, but has longer, distinctly inclined propodeal spines. Specimens from Yucatán, and Chiapas (Fig. 52) are the largest (WL 0.78-0.93mm), have a prominent clypeal body, somewhat longer scapes, small circular eye, strong nuchal groove, relatively shorter propodeal spines (PSI 0.19-0.22), and head macrosculpture with sharp ridges and unusually large areolae. Specimens from La Selva, Costa Rica are similar, but have normal clypeus and sculpture. Others from Costa Rica (Fig. 53) have shorter, more inclined propodeal spines (PSI 0.16-0.20), a more distinct petiolar node and keel, and subrectangular postpetiolar node. One specimen from Oaxaca is more like those from Belize; another is more like the San José specimens. With little material from most localities, I did not feel confident naming a new species for each variant, but as collections improve, I will not be surprised if this species undergoes fission.

At one time during the revision I also considered describing *cornuta*, *innotabilis*, *leptonana*, and

alzatei as variants of *creightoni*. But now I believe they can delineated. Comparison of *creightoni* with *leptonana* is found in key couplet 40; comparisons with *cornuta* and *alzatei*, in their respective discussions. All known specimens of *innotabilis* fall within the geographic range of *creightoni* and the two species are sympatric in at least one locality. All specimens of *creightoni* differ from *innotabilis* (Figs. 55-57, 97-98) in several ways: 1) erect hair on scapes and tibiae, 2) palpal formula 3,2, 3) clypeal apron with weak to distinct median notch, and 4) postpetiolar sternum not prominent. The regional variants differ in additional, but inconsistent ways.

A single queen from Trinidad (N. A. Weber #129) is very much like the three Costa Rican and Colombian queens provisionally assigned to *innotabilis* (Fig. 57) in size, general habitus, triangular mandibles, convex clypeus, robust mesosoma (MHI 1.28), propodeal spine size and shape, and subrectangular postpetiolar node, but differs in having erect hair on scapes and tibiae, little or no keel on petiolar peduncle, undulate ventral profile of postpetiole, and longitudinally oriented sculpture on the posterior head. On the basis of the pilosity, I provisionally assign the Trinidad queen to *creightoni*, but because of its great similarity in other respects to the *innotabilis*-like queens, and because neither set of queens is from an area where workers of *creightoni* or *innotabilis* have been collected, I do not feel confident of these assignments.

See also discussions of *alzatei*, *belti*, *brunnea*, and *cornuta*.

Distribution.—*Rogeria creightoni* ranges from southern Texas to Costa Rica; from about 1,500m in parts of Chiapas and Costa Rica to sea level. Types were collected in a residential area formerly mesquite-acacia savannah. Other specimens come from riparian woodland, palm-thorn forest, rain forest, pine-oak forest, cecropia forest, and cacao plantation. Most were taken in leaf litter on the ground. Some Belize specimens were under a termite nest; another in orchids.

Material Examined.—UNITED STATES: Texas, Cameron County (W. S. Creighton) [LACM]; Live Oak County (P. S. Ward) [mouthparts, sting] [MCZ]. MEXICO: Tamaulipas, Antiguo Morelos (S. & J. Peck); Vera Cruz, Pueblo Nuevo (E. O. Wilson); Oaxaca, 1 mi. E Reforma, nr. Tuxtepec (A. Newton) [mouthparts, sting]; 9 mi. E El Cameron (A. Newton); Chiapas, 12 mi. NW Ocozocoautla

(A. Newton); Yucatán, Chichén Itzá [MCZ]. BELIZE: Intercepted in Brownsville, Texas on orchids (Heinrich); nr. Belmopan (S. & J. Peck); Caves Branch (S. & J. Peck) [mouthparts, sting] [BMNH, CKC, MCZ, MZSP, USNM]. COSTA RICA: Heredia Province, La Selva (Talbot & VanDevender) [sting] [LACM], (D. M. Olson) [DMOC]; San José (H. Schmidt) [MZSP]; Jurrucarres (A. Bierig) [MZSP]; no locality (F. Nevermann) [MZSP]. 32 workers.

Rogeria innotabilis new species

Figs. 55-57, 97-98

Additions to *creightoni*-group diagnosis. WL 0.66-0.73mm. Mandibles triangular to slightly subtriangular. Palpal formula 2,2. Clypeal apron convex or slightly flattened medially. Eye small, elliptical. Nuchal groove clearly visible in lateral view, but not notching ventral outline of head. Mesosoma with nearly flat dorsal profile; a strong carina marks anterior edge of propodeum; MHI 0.90-1.00. Propodeal spines straight, wide. Petiolar keel moderate to large. Postpetiole subrectangular in dorsal view; sternum weakly to strongly prominent. Spiracular plate of sting apparatus with long spine on posteroventral corner. Sides of head areolate-rugose; mesosoma predominantly rugose; microareolate sculpture distinct on mesosoma sides. No erect hair on scapes or extensor surfaces of tibiae.

Holotype and Paratype Workers.—TL 2.4-2.7 (2.7), HL 0.60-0.65 (0.65), HW 0.50-0.57 (0.54), SL 0.40-0.45 (0.43), EL 0.06-0.08 (0.08) (7-13 facets), PW 0.37-0.41 (0.41), WL 0.66-0.73 (0.72), SpL 0.10-0.15 (0.13), PetL 0.26-0.30 (0.29), PpetL 0.14-0.16 (0.16)mm, CI 0.83-0.87 (0.84), OI 0.11-0.15 (0.15), SI 0.76-0.80 (0.78), PSI 0.15-0.20 (0.18), MHI 0.90-1.00 (0.98) N=10

Mandible with 5-7 teeth. If 5 or 6 teeth, it may have 1-3 denticles among proximal teeth. If 7 teeth, 4 proximals small. Basal tooth equal to or larger than penultimate tooth. Body of clypeus not projecting to anterior edge of apron. Eye small, elliptical. Posterior outline of head strongly to weakly convex. Metanotal groove absent or weak. Propodeal spines wide, straight; a bisecting line passes through or below anteroventral corner of pronotum. Petiolar keel weak or absent. Petiolar node evenly rounded from front to back, or apex somewhat flattened (Fig. 55). Postpetiolar node

highest in posterior half; node in dorsal view much as in Fig. 53. Sting apparatus like that of *inermis* (Fig. 42), except for spiracular plate shape (Fig. 56).

Head macrosculpture areolate on laterodorsa; areolate to transversely arching rugose-areolate on posterior head. Areolae on posterior head are larger and ridges sharper than elsewhere on head. Head dorsum slightly dulled by vestigial microsculpture; intervals smooth and shiny on sides and back. Anterior pronotal disc with 1-2 transverse rugae; rest of promesonotal dorsum longitudinally rugose with lateral spurs (Fig. 98) to rugose-areolate. Lateral pronotum areolate; meso- and metapleura mixed rugose and rugose-areolate. Anterior edge of propodeum marked by weak to strong transverse carina; dorsal face crossed by one or more transverse, sometimes branching, rugulae. Dorsum with vestigial microsculpture, but ventral sides quite distinctly microareolate (Fig. 97). Macrosculpture on sides and back of petiolar node very weakly areolate; microsculpture vague and effaced. Postpetiolar node shiny, almost completely smooth.

Color golden brown with yellowish appendages to brown with slightly lighter frontoclypeal area, mandibles, mesosoma sides, gaster, and legs.

Possible Queens.—TL 2.6-2.9, HL 0.59-0.61, HW 0.52-0.54, SL 0.40-0.41, EL 0.11-0.13, PW 0.44-0.50, WL 0.72-0.83, SpL 0.13-0.14, PetL 0.28-0.31, PpetL 0.14-0.17mm, CI 0.88-0.89, OI 0.21-0.24, SI 0.75-0.77, PSI 0.16-19, MHI 1.15-1.22. N=3

Collected outside known range of *innotabilis* workers, but have *innotabilis* traits: shapes of clypeus, nuchal groove, and postpetiole, and lack of erect/suberect hair on scapes and tibiae.

Differing from the worker by normal caste differences and the following. Parapsidal furrows indistinguishable from furrows in sculpture. Pronotum with 2-3 transverse rugae mesad, becoming longitudinally rugose to rugose-areolate on mesosoma sides; anterior katepisternum smooth. Mesonotum longitudinally rugose. Venation nearly identical to that of *belti* (Fig. 37).

Discussion.—For comparison with related species, see *creightoni*, *leptonana*, and *alzatei* discussions. Remarks about the queens are found in the *creightoni* and *curvipubens* discussions.

The name *innotabilis* (L., not remarkable) reflects my inability to identify any one salient feature on which to base the name for this species.

Distribution.—If the queens truly belong to *innotabilis*, this species ranges from Chiapas to northern Colombia, but workers have not been collected south of Nicaragua. Workers come from moist forest litter at 1000-1200m elevation. Collection sites for queens range from 10-1200m.

Material Examined.—**Holotype locality.** MEXICO: Chiapas State, 12 mi. NW Ocozocoautla, 3200 ft., 4-5-IX-1973, forest leaf litter (A. Newton) [MCZ].

Paratype Localities. MEXICO: 7 workers, holotype locality [mouthparts, sting, 1 coated for SEM] [BMNH, MCZ, MZSP]; 10 workers, Chiapas, 6-XII-1951, #5111574 (Cary) [2 mouthparts, stings] [USNM]. NICARAGUA: 2 workers, Km 139 near Matagalpa, Hotel Selva Negra, ca. 1200m, 18-VI-1978, forest leaf litter (C. Kugler & J. Hahn) [mouthparts, sting] [LACM, MCZ].

Nontype localities. COSTA RICA: Puntarenas Province, Monteverde, 1200m, 23-V-1979, #3496 (P. Ward) [MCZ]. COLOMBIA: Magdalena Department, Parque Tayrona, 210m, 1-X-76 (C. Kugler) [MCZ]; Guajira, Don Diego, 25-50m, 22-VI-76 (W. L. Brown & C. Kugler) [queen mouthparts, sting] [MCZ]. 3 queens.

Rogeria alzatei new species

Figs. 58-60, 99

Diagnosis.—WL 0.51-0.70mm, most <0.65mm. Mandibles subtriangular (usually) to triangular. Clypeus usually truncate. Eye usually moderately large, oval (10-14 facets, OI 0.17-0.20 in types), but occasionally half as large and elliptical. Nuchal groove weak to strong. Mesosoma compact (MHI 0.90-1.07). Propodeal spines usually slender, inclined. Petiolar peduncle with little or no keel. Postpetiolar node from above usually subrectangular; anterior edge of sternum not prominent. Macrosculpture areolate on head sides. Posterior head transversely rugose-areolate (Fig. 99). Pronotal disc rugose to rugose-areolate. No erect hair on scapes or legs.

Holotype and Paratype Workers.—TL 1.9-2.2 (2.2), HL 0.51-0.56 (0.54), HW 0.45-0.48 (0.47), SL 0.32-0.36 (0.35), EL 0.07-0.09 (0.09) (11-14 facets), PW 0.32-0.37 (0.35), WL 0.51-0.61 (0.59), SpL 0.10-0.12 (0.11), PetL 0.21-0.26 (0.23), PpetL 0.12-0.14 (0.13)mm, CI 0.87-0.88 (0.87), OI 0.17-0.20 (0.19), SI 0.72-0.74 (0.74), PSI 0.19-0.21 (0.19), MHI 1.01-1.07 (1.05). N=11

Mandible subtriangular; 5-6 teeth, two basal teeth small, subequal. Palpal formula 2,2. Clypeal apron truncate, with distinct corners; body of clypeus does not project to edge of apron. Posterior outline of head continuously convex. Nuchal groove indistinct in lateral view. Mesosoma's evenly convex dorsal profile ends abruptly fore and aft by rather sharp angles and by transverse sculpture. Metanotal groove weak or absent. Propodeal spines straight, narrow; a bisecting line passes through or just above anteroventral corner of pronotum. Corner of metapleural lobes a narrowly rounded right angle. Petiolar node evenly rounded front to back. Pygidium in the five specimens dissected with no piligerous tubercles.

Head laterodorsa rugose-areolate to areolate; sides more coarsely areolate. Microsculpture vestigial, producing irregular intervals on head dorsum and nearly smooth intervals on sides and posterior (Fig. 99). Anterior edge of pronotal disc with two transverse rugae. Promesonotal dorsum longitudinally rugose with numerous lateral spurs that sometimes connect, forming areolae. No macrosulpture on dorsal face of propodeum. Lateral pronotum longitudinally rugose-areolate. Meso- and metapleura with scattered, irregular rugae. Vestigial rugae on sides and back of petiolar node. Vague microsculpture makes roughened intervals on mesosoma, petiole and much of postpetiole; apex of postpetiolar node smooth.

Body yellowish-brown to reddish-brown with slightly darker head and gaster dorsa (black to naked eye); legs and antennae lighter, more yellowish or yellowish-brown.

Nontype Workers.— TL 1.9-2.5, HL 0.50-0.66, HW 0.42-0.56, SL 0.31-0.46, EL 0.05-0.10 (4-21 facets), PW 0.29-0.39, WL 0.51-0.70, SpL 0.09-0.13, PetL 0.21-0.28, PpetL 0.11-0.15mm, CI 0.81-0.88, OI 0.08-0.20, SI 0.71-0.85, PSI 0.15-0.21, MHI 0.90-1.07. N=32

Specimens from Guyana, French Guiana, and the Caribbean coast of Colombia extend the description as follows: Mandibles triangular with 3-4 teeth plus 4 basal denticles. Clypeal apron evenly convex, sometimes with medial emargination. Some with only 7-8 facets in the eyes. Some with wider propodeal spines (Fig. 60) or slightly downturned tips. Petiolar keel sometimes distinct (Fig. 60). Macrosulpture on head or pronotum more areolate.

Dominican Republic specimens have a con-

vex clypeus, a distinct metanotal groove as in Fig. 46, and subtrapezoidal postpetiolar node as in Fig. 51.

Specimens from Peru, Brazil, and Paraguay extend the description somewhat differently: Palpal formula 3,2. Clypeal apron usually truncate with rounded corners; occasionally convex. Several specimens with a somewhat prominent clypeal body (Fig. 59). Generally with smaller, elliptical eyes (OI of most 0.10-0.16), but the four workers from the Puerto Maldonado vicinity of Peru possess both the smallest eyes (Fig. 59) and largest eyes of the species (4 and 21 facets, OI 0.08 and 0.20). Nuchal groove forms a distinct notch in the head of one Peruvian worker (Fig. 59). Mesosoma generally less compact (MHI 0.93-1.03). Petiolar keel weak to distinct (Fig. 59). Some with postpetiolar node slightly wider in anterior half and shape similar to Fig. 66. Posterior pygidium with small tubercles in a Paraguayan specimen dissected. Sting apparatus with reduced anterodorsal corner of quadrate plate in a Brazilian worker.

Paratype and Nontype Queens.—TL 2.4-2.8, HL 0.56-0.60, HW 0.51-0.53, SL 0.35-0.38, EL 0.13-0.14, PW 0.44-0.49, WL 0.70-0.79, SpL 0.14-0.15, PetL 0.26-0.30, PpetL 0.15-0.16mm, CI 0.88-0.92, OI 0.25-0.26, SI 0.70-0.72, PSI 0.19-0.20, MHI 1.17-1.18. N=2

Both collected in the same localities as *alzatei* workers (BCI, Panama; Quebrada Susumuco, Colombia), but not in nest series. They most resemble *alzatei* workers in characteristic shapes of clypeus, mandible, mesosoma, propodeal spines, petiole and postpetiole, as well as sculpture and pilosity. Mesoscutellum projects slightly beyond posterior edge of metanotum. Posterior head rugose-areolate; no tubercles. Middorsum of head covered with erect hairs.

Discussion.—The extent of variation within this species makes me question whether this is a single species, but external characters that can be used in a key are either not marked enough to discount individual variation or not concordant. Further complicating the picture is the surprising amount of variation within four specimens from the same region of Peru, and unique sets of features found in single specimens from northern Colombia, Rio de Janeiro, and Peru. Specimens from Dominican Republic strongly resemble *creightoni* workers from the same localities, but differ in lacking erect hair on the scapes and tibiae

and in having narrower propodeal spines.

Given the geographic variation within *alzatei*, the species as a whole is difficult to distinguish clearly from *creightoni*, *innotabilis*, and *leptonana*. But if one compares only those specimens of *alzatei* that are in sympatry or parapatry with those three species, the differences are clear. The Panamanian *alzatei* workers differ from Central American *creightoni*, *innotabilis*, and *leptonana* in having: 1) subtriangular mandibles, 2) truncate clypeal apron, 3) larger, elongate-oval eye (OI 0.17-0.20), 4) more compact mesosoma (MHI 1.01-1.07), and 5) petiolar peduncle without a keel. They are also smaller than *creightoni* and *innotabilis* workers (WL 0.51-0.61mm vs. 0.66-0.93mm in *creightoni* and 0.66-0.73mm in *innotabilis*). Additional differences from *leptonana* are palpal formula (2,2 vs. 3,2 in *leptonana*), longer propodeal spines (PSI 0.19-0.20 vs. <0.16 in *leptonana*), and lack of erect hair on scapes.

See also the description of sibling species *scobinata* and the discussions of *belti*, *curvipubens*, *micromma*, *tribrocca* and *merenbergiana*.

The species is named in honor of a courageous Colombian intellectual and friend, Isaac Alzate.

Distribution.—The range of *alzatei* is from Panama to Paraguay, from western slopes of the Andes in Colombia to the Eastern coast of Brazil. All specimens were apparently taken as strays or in Berlese or Winkler sampling in moist forests from sea level to 1000m.

Material Examined.—**Holotype locality.** PANAMA: Canal Zone, Barro Colorado Island (BCI), 2-VII-79, W. L. Brown [MCZ].

Paratype localities. PANAMA: 3 workers, 1 queen from holotype locality [mouthparts, sting, 1 worker coated for SEM] [CKC, MCZ]; 2 workers, BCI, IV-V-1942, #4953 (J. Zetek) [USNM]; 2 workers, BCI, VI-X-1943, #5105 (J. Zetek) [whole specimen slide mounted] [USNM]; 1 worker, BCI, I-1960 (W. L. Brown & E. S. McCluskey) [MCZ]; 1 worker, BCI, 7-III-1975, FP#10 (C. Toft & S. Levings) [LACM]; 1 worker, Punta de los Chivos, W side Gatun Lake, 3km SW Gatún, 100m, 3-9-VII-1979 (W. L. Brown) [MCZ]; 1 worker, Bocas del Toro, Pipeline Road, 300m, 8.53N 82.10W, 18-VII-1987, #633 (D. M. Olson) [MZSP].

Nontype localities. DOMINICAN REPUBLIC: 16km ENE Pedernales, 800m (P. S. Ward). COLOMBIA: Guajira, Río Don Diego (W. L. Brown & C. Kugler); Magdalena Department, San Pedro, 550m (P. Ward) [MCZ]; Chocó Department, 10km

SW San José del Palmar, Río Torito, Finca los Guaduales, 800m (C. Kugler) [mouthparts, sting] [CKC, MCZ, MZSP]; Antioquia Department, Providencia, Estación Biológico, 600-800m, (C. Kugler) [MCZ]; Cundinamarca Department, Bogotá to Villavicencio, Km 79 (W. L. Brown & I. del Polania) [MCZ]; Meta Department, Bogotá to Villavicencio, 23km NW Villavicencio, Quebrada Susumuco, 1000m (S. & J. Peck; C. Kugler) [1 mouthparts, 2 stings, 1 whole specimen] [MCZ]. GUYANA (British Guiana): Oronque River (N. A. Weber) [MCZ]. BRAZIL: São Paulo State, Agudos (W. Kempf; C. Gilbert) [mouthparts, sting] [MZSP, USNM]; Rio de Janeiro (T. Borgmeier) [MZSP]; Federal District (C. A. C. Seabra) [MZSP]. PERU: Madre de Dios Department, Puerto Maldonado vicinity, 260m (C. Kugler) [CUIC, MCZ]. PARAGUAY: Central Province (F. Baud, et al.) [mouthparts, sting] [BMNH, MCZ (voucher), MHN]; Concepción, and Paraguarí Provinces (F. Baud, et al.) [BMNH, MHN]. 62 workers, 1 queen.

Rogeria scobinata new species

Figs. 61-62, 100

Diagnosis.—As in *alzatei*, except the following: Clypeal apron truncate (none emarginate). MHI 0.96-1.14. Posterior head with tuberculate macrosculpture (Fig. 100). Erect hair usually absent from head dorsum; if present, it is short and usually confined to posterior margin.

Holotype and Paratype Workers.—TL 1.9-2.5 (2.2), HL 0.50-0.60 (0.55), HW 0.42-0.52 (0.475), SL 0.31-0.40 (0.35), EL 0.06-0.09 (0.07) (10-14 facets), PW 0.30-0.40 (0.35), WL 0.50-0.67 (0.585), SpL 0.08-0.12 (0.095), PetL 0.19-0.26 (0.23), PpetL 0.12-0.16 (0.14)mm, CI 0.82-0.86 (0.86), OI 0.14-0.18 (0.15), SI 0.74-0.78 (0.74), PSI 0.16-0.19 (0.16), MHI 0.96-1.09 (1.00). N=5

Nontype Workers.—TL 1.9-2.5, HL 0.50-0.61, HW 0.44-0.52, SL 0.31-0.40, EL 0.06-0.09 (7-15 facets), PW 0.30-0.40, WL 0.51-0.68, SpL 0.08-0.13, PetL 0.19-0.28, PpetL 0.12-0.17mm, CI 0.84-0.88, OI 0.14-0.18, SI 0.70-0.78, PSI 0.16-0.20, MHI 1.00-1.14. N=32

Mandibles subtriangular, 5-toothed (sometimes with 1-2 additional basal denticles), decreasing in size basad; basal tooth small. Palpal formula 2,2. Median clypeus of some nontype workers from Colombia like that of *alzatei* (Fig. 58), but type specimens with less prominent corners (Fig. 61)

and other nontypes (Bolivia, some Brazil) have an almost evenly convex clypeal apron. Body of clypeus not projecting over clypeal apron. Posterior outline of head weakly concave medially to weakly convex. Nuchal groove clearly visible in side view. Eye oval to elliptical. Anterior and dorsal faces of pronotum may join smoothly, or in a weak angle (Fig. 61). Metanotal groove broad, slightly less to slightly more impressed than shown in Fig. 61, bordered behind by a transverse carina. Propodeal spines inclined. Metapleural lobes moderately prominent; corner varies from sharply angular (Ecuador, some Peru) to rounded as in Fig. 44 (some Paraguay). Ventral petiolar peduncle usually with a weak, nonlamellate keel, but some Ecuadorian specimens with distinct keel. Postpetiolar node in dorsal view subrectangular as in Fig. 58. Pygidium with a pair of median, columnar, piligerous tubercles near caudal edge (barely visible in dissection microscope at 50X).

Laterodorsa and sides of head densely areolate. Posterior head with short triangular, blunt tubercles in more or less distinct rows (Fig. 100). Tuberculate sculpture usually extends across posterior quarter of head, but in a few specimens from Leticia, Benjamin Constant, and Paraguay, the ridges between the tubercles are not always completely lost, so the posterior head appears mostly fragmented-rugose, with only a few of the triangular tubercles. Interstices on most of head somewhat dulled by indistinct areolate microsculpture, but smoother and quite shiny between tubercles on back of head; sides sometimes rather strongly microareolate. Anterior edge of pronotal disc with 1-4 more or less transverse rugae. Rest of promesonotum longitudinally rugose with frequent incomplete lateral spurs. Mesosoma sides weakly and sparsely rugose to rugose-areolate, but more strongly microareolate than on pronotal disc. Dorsal face of propodeum usually lacking macrosculpture, but rather strongly microareolate. Rest of mesosoma with indistinct microareolate sculpture. Petiolar node with broken vestigial macrosculpture. Postpetiole without macrosculpture; nearly smooth on top. Sides of nodes with weak microareolate sculpture that imparts a granular appearance; microsculpture usually weaker on postpetiole.

Workers from Leticia have 8-10 erect hairs along posterior rim of head and those from Benjamin Constant have sparse, short erect hairs on

the posterior rim and along the midline.

Color brown to golden brown. Legs and antennae generally lighter than rest of body; gaster sometimes darker.

Queens.—TL 2.4-2.6, HL 0.55-0.58, HW 0.46-0.52, SL 0.34-0.38, EL 0.11-0.13, PW 0.41-0.45, WL 0.68-0.74, SpL 0.11-0.14, PetL 0.25-0.27, PpetL 0.14-0.16mm, CI 0.84-0.90, SI 0.70-0.75, PSI 0.16-0.19, MHI 0.64-0.69. N=7

Habitus shown in Fig. 62. Parapsidal furrows indistinguishable from grooves in sculpture. Anterior pronotum transversely rugose to rugose-areolate, becoming longitudinal on sides. Mesoscutum with longitudinal, often diverging rugae; mesoscutellum rugose or rugose-areolate.

Discussion.—*Rogeria alzatei* is a sibling species of *scobinata*, with which it is sympatric in Peru, Brazil, and Paraguay, but can be distinguished by characters in the diagnosis and key. The pair of columnar tubercles on the pygidium may also be distinctive.

The name *scobinata*, meaning having the nature of a rasp, refers to the sculpture on the posterior head, which has rows of teeth like a rasp.

Distribution.—*Rogeria scobinata* ranges from the north coast of South America to Paraguay at elevations below 1000m. All specimens were taken as strays in tropical forest, mostly by Berlese or Winkler sampling of leaf litter, rotten wood, or moss.

Material Examined.—**Holotype locality**. PERU: Madre de Dios Department, 3km N Puerto Maldonado, 260m, primary forest remnant by side of road, berlesate of leaf litter and rotten wood, 13-16-VI-1981 (C. Kugler and R. R. Lambert) [MCZ].

Paratype localities. PERU: 2 workers, 1 queen, holotype locality [MCZ]; 22 workers, 2 queens, 5km E Puerto Maldonado on Río Tambopata, Finca Medina, 260m, primary forest berlesate, 13-16-VI-1981 (C. Kugler and R. R. Lambert) [mouthparts, sting, 1 worker coated for SEM] [BMNH, CKC, LACM, MCZ, MZSP, MHN, USNM].

Nontype localities. TRINIDAD: Nariva Swamp (N. A. Weber) [MCZ]. SURINAM: La Poulle, Vank, and Tambahredjo (J. van der Drift) [MZSP]. COLOMBIA: 7km N Leticia (S. and J. Peck) [MCZ]. ECUADOR: Napo Province, Limoncocha and 20km S Tena (S. and J. Peck); Pastaza Province, 25km N Puyo, (S. and J. Peck) [MCZ]. PERU: Loreto Department, Ramon Castillo (S. and J. Peck), 15km WSW Yurimaguas (P. S.

Ward) [PSWC]; Pasco Department, near Pozuzo, (C. Kugler and R. R. Lambert); Madre de Dios Department, Puerto Maldonado vicinity near Lake Sandoval (C. Kugler and R. R. Lambert) [CKC, CUIC, MCZ]. BOLIVIA: La Paz Department, Caranavi (C. Kugler and R. R. Lambert) [MCZ]. BRAZIL: Pará State, (collector name unreadable); Amazonas State, Benjamin Constant and vicinity (W. L. Brown); Mato Grosso State, Utiariti, Rio Sauêruiná [=R. Papagaio] (Lenko and Pereira); São Paulo State, Piraçununga Municipality, Cachoeira das Emas (EEBP) (W. L. Brown); Rio de Janeiro (T. Borgmeier) [MCZ, MZSP]. PARAGUAY: Alto Paraná, Amambay, Caaguazú, Canendiyu, and Concepción Provinces (F. Baud et al.). 122 workers, 13 queens.

Rogeria tribrocca new species

Fig. 63

Additions to *creightoni*-group diagnosis. WL 0.62mm. Eye small, elliptical. Clypeal apron with three acute processes. Metapleural lobes very low, broadly rounded. Postpetiolar node widest in anterior half. Posterior edge of gaster T3 with median spine that seems to arise from a weak concavity. Sides of head smooth. Promesonotal dorsum with fine rugae diverging and branching from anterior pronotum, becoming weak on meso- and metanota; interrugal spaces rather wide. No erect hair on scapes or legs.

Holotype Worker.—TL 2.3, HL 0.61, HW 0.51, SL 0.40, EL 0.05 (7 facets), PW 0.36, WL 0.62, SpL 0.10, PetL 0.26, PpetL 0.13mm, CI 0.83, OI 0.10, SI 0.78, MHI 0.93, PSI 0.16.

One mandible with six teeth; the other with the penultimate basal replaced by two denticles (Fig. 63). Nuchal groove forms a weak notch in lateral view of head. Pronotal shoulders seen from above subangular. Propodeal spiracles 1 diameter from nearest edge of infradental lamella. Ventral petiole somewhat obscured by glue, but probably with distinct keel and dentate process. Petiolar node narrow; nearly symmetrically rounded in lateral view. Postpetiolar node with broadly confluent anterior and dorsal faces and short posterior face. Postpetiolar sternum with perpendicular anterior corner and flat ventral profile (Fig. 63); node in dorsal view widest in anterior half, as in Fig. 74. Sting shaft projecting from gaster acute, with low dorsal flange.

Laterodorsa of head longitudinally rugose-areolate. Posterior head with transversely arching rugae. Intervals with weak microsculpture. Dorsal face of propodeum with 3 weak transverse rugulae. Mesosoma sides with sparse, indistinct, longitudinal rugulae. Microsculpture on mesosoma even weaker than on head; interrugal spaces shiny, nearly smooth. Petiolar and postpetiolar nodes nearly smooth, shiny.

Mesosoma dorsum with eight pairs of erect hairs (some matted down); nodes each with two pairs of posterodorsally projecting hairs.

Color of body and appendages brownish-yellow; dorsum of gaster T1 slightly darker.

Discussion.—Both *curvipubens* (Figs. 74-76, 101-102) and *alzatei* (Figs. 58-60, 99), have also been collected in Quebrada Susumuco or nearby Villavicencio environs. But they do not have a three-toothed clypeal apron or a median spine on the third tergum of the gaster.

The name *tribrocca* (*brocca* L., projection of teeth) refers to the three tooth-like projections of the clypeal apron.

Material Examined.—**Holotype locality**. COLOMBIA: Meta Department, Quebrada Susumuco [or Susumuco], 23km NW Villavicencio, 1000m, forest litter, 5-III-1972, #B-234 (S. and J. Peck) [MCZ].

Rogeria carinata new species

Fig. 64

Rogeria curvipubens: M. Smith 1937:851. Misidentification.

Additions to *creightoni*-group diagnosis. WL 0.53-0.67mm. Clypeal apron convex. Eye small. Propodeal spines small. Mesosoma low (MHI 0.86-0.96). Postpetiole subrectangular in dorsal view; sternum with distinct, but not projecting anterior lip. Sides of head rugose. Promesonotal dorsum carinate, with broad, shiny intervals. Short erect-suberect hairs on scapes, but not on extensor surfaces of legs.

Holotype and Paratype Workers.—TL 2.0-2.5 (2.2), HL 0.51-0.61 (0.55), HW 0.44-0.54 (0.46), SL 0.35-0.42 (0.38), EL 0.05-0.06 (0.06) (7-10 facets), PW 0.31-0.41 (0.34), WL 0.53-0.67 (0.57), SpL 0.05-0.10 (0.08), PetL 0.19-0.24 (0.22), PetW 0.10-0.13 (0.11), PpetL 0.11-0.14 (0.12), PpetW 0.14-0.18 (0.15)mm, CI 0.86-0.89 (0.86), OI 0.11-0.12 (0.13), SI 0.78-0.80 (0.83), PSI 0.09-0.15 (0.14), MHI 0.86-0.96 (0.92). N=15

Mandibles with 5 teeth and 0-2 denticles between the two basal teeth; basal tooth larger than penultimate basal. Eyes oval to elliptical. Nuchal groove weak. Posterior outline of head weakly convex to weakly concave. Mesosoma from above broad, angular at shoulders, but strongly constricted behind; metanotum half as wide as shoulders. Propodeal spiracle small, one diameter from posterior edge of propodeum. Metapleural lobes small, rounded. Ventral petiole with weak keel. Postpetiole highest in posterior half. Sting apparatus with slightly lower valve chamber than that of *inermis* (Fig. 42).

Laterodorsa of head rugose-areolate in Puerto Rican specimens. Posterior head transversely arched areolate-rugose. Interrugal spaces on head weakly and irregularly roughened on dorsum; smoother on sides and posterior. Anterior face of pronotum with transverse carinules that continue onto shoulders and curve dorsad. Meso- and metapleura with irregular longitudinal rugae; intervals smooth dorsally, but vestigially microareolate below level of propodeal spiracle. Dorsal face of propodeum mostly smooth with 0-3 transverse rugulae. Petiolar node vaguely microareolate; macrosulpture absent or indistinct on sides. Postpetiole vaguely microareolate on venter; smooth and shiny on dorsum. Gaster smooth and shiny.

Mesosoma dorsum with 10 pairs of erect hairs.

Color brownish-yellow; head and mesosoma slightly darker than rest of body. Some Puerto Rican specimens slightly darker, with reddish hue to head and mesosoma.

Discussion.—The carinate macrosulpture of the promesonotum with very shiny intervals serves to differentiate *carinata* from others of the *creightoni*-group. See also the discussion of *nevadensis*, which has similar sculpture.

Material Examined.—**Holotype locality.** BRITISH VIRGIN ISLANDS: Tortola, Long Bay, berlesate from soil and leaves, 25-VII-1965 (I. Proj. Staff) [MCZ].

Paratype localities. 1 worker, holotype locality [MCZ]. PUERTO RICO: 3 workers, Guanica, 7-IV-1982, #75 (J. A. Torres) [LACM]; 1 worker, Cayo Ratones, 17-VII-1982, #77 (J. A. Torres) [LACM]; 8 workers, Cayo L. Peña, Humacao, 9-X-1982, #91 (J. A. Torres) [2 stings] [BMNH, CKC, LACM, MCZ, MZSP]; 1 worker, Ensenada, #1409, (no collector) [USNM].

Rogeria nevadensis new species

Fig. 65, 94

Additions to *creightoni*-group diagnosis. WL 0.58-0.65mm. Clypeal apron emarginate. Eye small. Shoulders rounded; promesonotum and propodeum meet without a strong angle. Postpetiolar node widest in anterior half. Sides of head largely smooth and shiny. Promesonotal dorsum longitudinally rugose, with low, rounded ridges and no lateral spurs; interrugal spaces wide and nearly smooth. No erect hair on scapes or extensor surfaces of legs.

Holotype and Paratype Workers.—TL 2.2-2.5 (2.2), HL 0.59-0.62 (0.59), HW 0.49-0.51 (0.49), SL 0.40-0.42 (0.40), EL 0.06-0.08 (0.06) (7-10 facets), PW 0.34-0.38 (0.34), WL 0.58-0.65 (0.58), SpL 0.09-0.10 (0.09), PetL 0.22-0.25 (0.22), PpetL 0.12-0.14 (0.12)mm, CI 0.81-0.83 (0.82), OI 0.13-0.15 (0.13), SI 0.82, PSI 0.15, MHI 0.93-0.95 (0.93). N=3

Mandibles with 5 teeth plus two denticles, or six teeth plus 1-2 denticles among basal teeth; basal tooth not larger than penultimate basal. Eye elliptical. Nuchal groove weak. Promesonotum slopes to join dorsal face of propodeum without an angle or transverse carina; metanotal groove weak or absent. Propodeal spines narrow; a bisecting line passes through anteroventral corner of pronotum. Propodeal spiracle within one diameter of edge of infradental lamella. Petiolar peduncle with indistinct keel. Postpetiolar node with a short vertical anterior face and long, sloping dorsal face; posterior face slightly concave in two paratypes. Postpetiole widest in anterior half as in Fig. 66. Postpetiolar sternum with flat ventral profile and somewhat prominent anterior edge. Sting shaft projecting from apex is like that of *inermis* (Fig. 42).

Laterodorsa of head rugose-areolate. Posterior head with transversely arching rugae. Head shiny with effaced macrosulpture, especially on sides and back. Anterior pronotum crossed by several incomplete rugae. Lateral mesosoma (Fig. 94) with little distinct macrosulpture and smooth, shiny intervals. Dorsal face of propodeum with transverse rugae and effaced microareolate sculpture. Both nodes with weak, effaced microareolate sculpture and vague, vestigial rugose macrosulpture.

Mesosoma dorsum with 10-11 pairs of erect hairs; 2-3 pairs project posterodorsally from each node.

Color brown to dark reddish-brown (mesosoma and head dorsum may be darkest), with brownish-yellow appendages and frontoclypeal area.

Gynecoid Worker.—A nontype specimen is worker-like in most respects, but is larger (WL 0.70mm; PSI 0.19), has distinct mesonotal and metanotal sutures and partially formed wing attachments. Pronotum transversely rugose; mesoscutum longitudinally rugose. Sides of postpetiolar node from above more evenly convex.

Discussion.—*Rogeria merenbergiana* (Figs. 46-48), which is also found at high elevations in Colombia and Ecuador, has similar shapes of clypeus, mesosoma and propodeal spines, and somewhat reduced sculpture, but: 1) are a little larger than *nevadensis* (WL 0.69-0.83mm), 2) have a metanotal impression, 3) have erect hair on second and third tibiae and scapes, and 4) are more distinctly sculptured, with sides of head rugose.

Rogeria carinata (Fig. 64) from Puerto Rico and Tortola have the same size, pilosity, shape of waist, and extensive shiny spaces on mesosoma, but: 1) the metanotal-propodeal junction is more angular, 2) the sides of the head are distinctly rugose, 3) the promesonotal dorsum has straighter parallel ridges and smoother intervals, and 4) the propodeal spines are generally shorter (PSI 0.11-0.15).

Rogeria nevadensis takes its name from the Sierra Nevada de Santa Marta, site of the type localities.

Material Examined.—**Holotype locality**. COLOMBIA: Magdalena Department, SE Santa Marta, Cuchilla San Lorenzo, vicinity of El Campano, 1340m, rain forest, VI-1976 (W. L. Brown) [MCZ].

Paratype localities. 1 worker, same site as holotype [coated for SEM] [MCZ]. 1 worker, COLOMBIA: Magdalena, E Orihueca, 74.03W 10.55N, San Pedro de la Sierra, 1300m, rotten log in coffee plantation, 10-II-1977 (C. Kugler) [LACM].

Nontype locality. One gynecoid worker, berlesate at the San Pedro de Sierra site (C. Kugler) [MCZ].

Rogeria leptonana new species

Figs. 66-70

Additions to *creightoni*-group diagnosis. WL 0.54-0.66mm. Median clypeal apron concave to convex. Eyes small, nearly circular. Propodeal spines small to absent. Mesosoma low, slender (MHI 0.78-0.90; PW/WL 0.53-0.58). Petiole with moderate to large keel. Postpetiolar node from above as in Fig. 66. Anterior lip of postpetiolar sternum not prominent. Sides of head distinctly macro- or microsculptured. Mesosoma rugose, sometimes with strongly microareolate sides. Erect hair on scapes and usually on extensor surfaces of tibiae.

Holotype and Paratype Workers.—TL 2.1-2.3 (2.1), HL 0.50-0.55 (0.51), HW 0.43-0.46 (0.44), SL 0.32-0.34 (0.32), EL 0.05-0.07 (0.06) (7-10 facets), PW 0.32-0.36 (0.33), WL 0.57-0.61 (0.57), SpL 0.07-0.10 (0.07), PetL 0.20-0.23 (0.21), PpetL 0.12-0.13 (0.13)mm, CI 0.83-0.86 (0.86), OI 0.11-0.15 (0.14), SI 0.73-0.75 (0.73), PSI 0.12-0.16 (0.12), MHI 0.83-0.90 (0.83). N=4

Mandibles triangular, with 5 teeth and occasional denticle; basal tooth larger than penultimate tooth. Palpal formula 3,2. Median clypeal apron concave. Body of clypeus projecting slightly over edge of apron. Posterior outline of head very weakly concave or flat. Nuchal groove indistinct in lateral view. Mesosoma dorsal profile nearly flat. Propodeal spines short with wide base; a bisecting line passes just above anteroventral corner of pronotum. Spiracle about 1 diameter from nearest edge of infradental lamella. Petiolar node small. Postpetiole widest in anterior half (Fig. 66). Ventral profile of sternum concave; anterior lip not prominent.

Head rugose-areolate to areolate on laterodorsa and sides, transversely areolate-rugose on posterior head. Macrosculpture well defined on posterior head, weaker on dorsum and sides. Areolate microsculpture gives a granular appearance to dorsum and sides of head, where it largely obscures the weak macrosculpture; intervals on posterior head nearly smooth. Anterior edge of pronotal disc transversely rugose-areolate. Rest of promesonotal dorsum longitudinally rugose with occasional laterals; microsculpture obscure. Mesosoma sides with confused areolate macro- and microsculpture; the latter quite strong, giving a granular appearance. Petiole appears granular, with vestigial overlying macrosculpture.

Postpetiolar node smooth; sides and venter appear granular.

Mesosoma dorsum with more than 12 pairs of emergent erect hairs; nodes each with at least 2 pairs of long posterodorsally projecting hairs. Tibiae with erect hairs.

Body yellowish-brown to brownish-yellow; frontoclypeal area and appendages lighter, more yellowish.

Nontype Workers.—TL 2.2-2.5, HL 0.54-0.60, HW 0.43-0.50, SL 0.34-0.40, EL 0.04-0.08 (5-9 facets), PW 0.33-0.35, WL 0.54-0.66, SpL 0.03 (no spines)-0.11, PetL 0.21-0.26, PpetL 0.12-0.16mm, CI 0.80-0.83, OI 0.09-0.12, SI 0.77-0.83, PSI 0.05 (no spines)-0.18, MHI 0.78-0.90. N=8

Type description extended as follows. Mandibles subtriangular in Dominican Republic specimens. Clypeal apron convex in the Chiriquí, Panama specimens and truncate in Chiapas and Dominican Republic. Body of clypeus not projecting beyond clypeal apron in Chiapas specimen. Basal tooth may equal penultimate basal in size. Scapes slightly longer (SI 0.77-0.83). The Ocosingo, Mexico specimen has slightly longer spines than types (PSI 0.18); Cerro Pico Blanco, Costa Rica specimens have very short spines (PSI 0.07-0.10) those from Panama are devoid of armature (Fig. 67). Short propodeal spines of Costa Rican specimens are more inclined than in types; a bisecting line passes just below the axilla. Postpetiole of Chiapas and Pedernales, Dominican Republic specimens narrower than others (PpetW/PpetL 1.23-1.28 vs. 1.41-1.56); Pedernales postpetioles are widest in posterior half. Microsculpture on head may be less distinct than in types. Panamanian specimens lack erect hair on extensor surfaces of tibiae and have only 9 pairs of erect hairs on the mesosoma dorsum.

Possible Queens.—TL 2.6-2.8, HL 0.60-0.61, HW 0.52-0.53, SL 0.40, EL 0.12-0.13, PW 0.45, WL 0.73-0.78, SpL 0.14-0.17, PetL 0.28-0.30, PpetL 0.14-0.16mm, CI 0.86-0.88, OI 0.20-0.23, SI 0.75-0.77, PSI 0.19-0.22, MHI 0.92-0.97. N=2

Both queens collected on the north coast of Colombia. Though workers of *leptonana* are unknown from South America, these queens (Fig. 68) have strongest affinities to *leptonana* workers: Mandible with 5 teeth; basal as large as or larger than penultimate basal. Clypeal apron emarginate. Posterior outline of head flat. Propodeal spines wide. Propodeal spiracle 2 diameters from edge of

infradental lamella. Mesosoma low. Petiolar peduncle with prominent lamellate keel; node short. Pygidium and sting apparatus as in workers.

Sculpture also as in workers. Microsculpture present but indistinct on head and mesosoma. Pronotum with 1-2 transverse rugae medially; laterally rugose. Meso- and metanota longitudinally rugose, with nearly smooth, shiny intervals. Meso- and metapleura longitudinally rugose, except for smooth, shiny mesokatepisterna. Dorsal face of propodeum smooth. Petiole, including peduncle, and postpetiole nearly smooth.

There are differences, however. Palpal formula 2,2 in the dissected Guajiran queen (vs. 3,2 in workers). One queen has a nearly subrectangular postpetiole. Neither has erect hair on the tibiae.

Males.—TL 2.9, HL 0.51-0.53, HW 0.55-0.56, SL 0.32-0.34, EL 0.25, PW 0.50-0.53, WL 0.91-0.95, PetL 0.32-0.33, PpetL 0.15-0.16mm, CI 1.04-1.10, SI 0.58-0.61. N=4.

All four specimens from a nontype nest series, Cerro Pico Blanco, near San José, Costa Rica. Mandible with 4 teeth. Clypeal margin convex. Antennal flagellomeres 2-11 subequal in length and width; not twisted. Lateral habitus shown in Fig. 69. Mayrian and parapsidal sutures present. Forewing venation as in Fig. 30 hind wing as in Fig. 37. Genitalia shown in Fig. 70. Mandibles smooth; clypeus nearly so. Head dorsum areolate; sides behind eyes rugose; posterior head rugose-areolate. Mesosoma longitudinally rugose on lateral pronotum and dorsal meso- and metapleura. Anterior and ventral mesopleura smooth. Ventral metapleura diagonally rugose. Anterior portion of mesonotum with vague effaced microsculpture; longitudinally rugose macrosculpture begins at level of wing and continues onto mesoscutellum. Propodeum areolate. Petiole microareolate, with a few weak, fine longitudinal rugae. Postpetiole and gaster smooth. Abundant erect and decumbent pilosity on scapes, head, mesosoma, waist, and gaster. Head brown, except for yellowish-brown frontoclypeal area and yellow mandibles. Rest of body and appendages brownish-yellow; gaster T1 and S1 darker.

Discussion.—The nontype specimens from the high elevations of Costa Rica may belong to a distinct species defined by the complete absence of propodeal spines, but presently they seem linked to the types by the two specimens from Panama, which have intermediate spine length.

The different palpal formula of the workers and queens and the fact that workers and queens specimens come from different countries cause doubt about whether the queens are correctly assigned. But most morphological characters fit *leptonana* better than any other species. See also the *curvipubens* discussion.

The range *innotabilis* (Figs. 55-57, 97-98) overlaps that of *leptonana* at least in southern Mexico and Nicaragua, perhaps more, if queens are correctly assigned. Workers of *innotabilis* differ as follows: 1) no erect hair on scapes, 2) generally larger (WL 0.66-0.73mm), 3) clypeus evenly convex, 4) palpal formula 2,2, 6) postpetiolar node widest midlength and sternum moderately to strongly prominent.

See also *creightoni*, *curvipubens*, *alzatei*, *inermis*, and *neilyensis* discussions.

The name from *leptos* (G., slender) and *nanus* (L., dwarf) describes the habitus of this species.

Distribution.—Specimens range from Chiapas, Mexico to the northern coast of Colombia; from sea level to 1750m. Type specimens come from lowland rain forest, Colombian specimens from forest receiving about 2m strongly seasonal annual precipitation. Montane specimens from Costa Rica were taken under large rocks in a pasture; those from Panama were collected in debris under a stump in unknown habitat.

Material Examined.—Holotype and paratype locality. PANAMA: Canal Zone, Barro Colorado Island; 2 workers including holotype, II-III-1943, #5059 (J. Zetek) [USNM, lot 43 3035]; 5 workers, VI-X-1943, #5105 (J. Zetek) [1 whole specimen slide mounted] [USNM, lot 43-16534]; 4 workers, 14-II-1976 (A. Newton) [MCZ]; 1 worker, 27-II-1976 (A. Newton) [MCZ]; 1 worker, I-1960, #B-9 (W. L. Brown & E. S. McCluskey) [mouthparts, sting] [MCZ]; 2 workers, 7-III-1975, FP#6 (C. Toft & S. Levings) [LACM].

Nontype localities. MEXICO: 1 worker, Chiapas, Ocosingo Valley, Finca El Real, 1-7-VII-1950 (Goodnight & Stannard). COSTA RICA: 6 workers, 4 males, Cerro Pico Blanco, near San José, 1750m, 15-III-1987 (W. Eberhard & W. L. Brown) [2 male genitalia] [MCZ]. PANAMA: 2 workers, Chiriquí Province, near Nueva California, W of Finca Palo Santo, 1550m, 5-III-1959, #B-377 (H. S. Dybas) [MCZ]. COLOMBIA: 1 queen, Guajira, near Don Diego, Quebrada Guacoche, 10m, 22-VII-1976 (W. L. Brown & C. Kugler) [queen mouth-

parts, sting] [MCZ]; 1 queen, Magdalena Department, Parque Nacional Tayrona, near Pueblito, 210m, 11-XI-1976 (C. Kugler) [MCZ]. DOMINICAN REPUBLIC: 3 workers 16km ENE Pedernales, 800m, 9-IX-1992 (P. S. Ward); 1 worker 4km NW Villa Altamira, 200m, 12-IX-1992 (P. S. Ward) [MCZ].

Rogeria belti Mann

Figs. 35-39, 91-92

Rogeria belti Mann 1922:31. Syntype workers, HONDURAS: Progreso (Mann) [USNM] [2 of 12 syntypes examined].

Diagnosis.—WL 0.61-0.94mm. Clypeal apron usually with median notch, sometimes convex. Eyes large, oval. Propodeal spines moderately long, inclined (bisecting line usually passes well below anteroventral corner of pronotum). Mesonotal dorsum usually strongly areolate; postpetiolar node smooth. Scape with erect hair. Hair on mesosoma dorsum decumbent to erect; not clearly sorting into two kinds. Head dorsum and gaster T1 with short decumbent and long erect/suberect hair. No erect hair on extensor surfaces of tibiae.

Workers.—TL 2.4-3.4, HL 0.56-0.80, HW 0.48-0.69, SL 0.39-0.55, EL 0.10-0.14 (20-36 facets), PW 0.34-0.51, WL 0.61-0.94, SpL 0.11-0.20, PetL 0.25-0.39, PpetL 0.13-0.21mm, CI 0.82-0.89, OI 0.18-0.25, SI 0.76-0.89, PSI 0.14-0.24. N=31

Mandibles with 5-6 teeth; typically 5 teeth evenly decreasing in size basad followed by a large basal tooth, or 4 teeth are followed by 1 or 2 denticles and a large basal tooth (Fig. 35). A few specimens in scattered localities have an additional denticle between the third and fourth teeth. Palpal formula 3,2. Clypeal apron medially emarginate in most, but evenly convex in specimens from Miami, Costa Rica. Body of clypeus not projecting over clypeal apron. Posterior outline of head weakly convex, sometimes with a slight median concavity. Eyes sometimes narrower than shown in Fig. 35; widest in Miami, Costa Rica specimens (Fig. 36). Pronotum from the side usually subangular at junction of anterior and dorsal faces; from above, shoulders well rounded. Metanotal groove either hardly visible, or a distinct narrow groove, or a small step in mesosoma profile; usually marked behind by a transverse ridge (Fig. 35). Propodeal spiracles small, slightly more than 1 diameter from posterior edge of propodeum, facing slightly caudad. Metapleural lobes nar-

rowly to broadly rounded. Petiolar keel not lamelate. Petiolar node usually dome-shaped (Fig. 35), but sometimes slightly flattened on top. Postpetiolar node highest in posterior half; dorsal view subtrapezoidal as in Fig. 49; sternum long and flat. Sting apparatus as in *creightoni*-group diagnosis.

Longitudinal rugae on frontal lobes become rugose-areolate by midlength of head; middle pair of rugae usually remain free of cross-ridges until posterior head. Cheeks and laterodorsa areolate to rugose-areolate. Sides of head strongly areolate in most, but nearly smooth in Miami, Costa Rica specimens. Posterior head areolate with no clear transverse pattern in most, but transversely arching rugose to rugose-areolate in ants from Miami, Costa Rica and Colombia. Promesonotum generally coarsely areolate to areolate-rugose (Figs. 91-92), but lower in relief and more rugose in specimens from Miami, Costa Rica and some from Colombia. Meso- and metapleura confused areolate to rugose. Dorsal face of propodeum predominantly transversely rugose, except for Boquete, Panama specimens, in which dorsal face is indistinctly areolate. Petiolar node not as heavily sculptured as mesosoma, but distinctly areolate to weakly rugose-areolate; dorsal and anterior faces often free of macrosculpture. Intervals irregular and usually shiny. Microsculpture generally weak and indistinct, producing quite shiny intervals in macrosculpture, especially on sides of head, mesosoma, and on petiolar node. Head dorsum and petiolar node of Miami, Costa Rica specimens with more pronounced microsculpture, lending a granular appearance.

Most dark reddish-brown with yellowish-brown mandibles, antennae and legs. Specimens from Boquete, Panama and Miami, Costa Rica lighter, with more yellowish appendages and end of gaster. Mexican specimens reddish-black with brown appendages.

Queens.—TL 3.0-3.4, HL 0.68-0.74, HW 0.58-0.64, SL 0.48-0.52, EL 0.18-0.20, PW 0.48-0.59, WL 0.88-1.00, SpL 0.13-0.21, PetL 0.29-0.37, PpetL 0.18-0.20mm, CI 0.84-0.85, SI 0.77-0.86, PSI 0.14-0.21. N=5

Like the worker except for normal queen structures and the presence of predominantly rugose sculpture on the mesonotum. Parapsidal furrows indistinguishable from furrows in sculpture. Habitus similar to that of *merenbergiana* queen

(Fig. 48), but mesonotum slightly more convex and propodeal spines longer and narrower. Wings as in male (Fig. 37).

Males.—TL 3.4-3.5, HL 0.59-0.61, HW 0.65-0.70, SL 0.32-0.35, EL 0.32, PW 0.71-0.72, WL 1.12-1.19, PetL 0.40-0.41, PpetL 0.19-0.20mm, CI 1.11-1.15, SI 0.50. N=2

All five specimens from La Ceiba, Honduras. Mandibles with 5 teeth. Clypeus weakly emarginate. Flagellomeres 2-11 straight, subequal in length and width. Wings, habitus and genitalia as shown in Figs. 37-39. Rs vein curves away from leading edge of wing; r-m vein lost; M vein short. Mandibles smooth except for piligerous punctures. Face very finely areolate, opaque. Posterior head longitudinally rugose. Pronotum weakly punctate. Mesonotum and posterior face of propodeum finely rugulose and densely punctured. Mesopleura longitudinally striate right under wing, otherwise smooth and shiny with piligerous punctures. Metapleura and sides of propodeum longitudinally rugose. Posterior face of propodeum rugose-areolate. Petiolar node finely punctate to smooth. Postpetiole and gaster smooth and shiny. Hair as in worker, but more dense. Color brownish-black, with brown legs and antennae and brownish-yellow mandibles.

Discussion.—The 18 specimens from Miami, Costa Rica (Fig. 36) differ from typical *belti* in having: 1) an evenly convex clypeus, 2) a larger eye (31-36 facets vs. 20-30 in typical *belti*), 3) smaller propodeal spines (PSI 0.15-0.18 vs. 0.19-0.24 in typical *belti*), 4) generally narrower head, 5) head and mesosoma more rugose than areolate, and 6) weaker macrosculpture in general, but microsculpture stronger on head and petiolar node. Queens from Miami, Costa Rica like their workers have narrower heads, shorter propodeal spines and weaker sculpture than the four from Guatemala, Panama and the Osa Peninsula of Costa Rica. I considered these Miami ants a new species until the arrival of new specimens from Costa Rica and Colombia. One worker from Heredia, Costa Rica has a convex clypeus like the Miami ants, but eye and propodeal spine size just within the typical *belti* range. Other workers from Colombia have eyes as large as any of the Miami specimens, but an emarginate clypeus like typical *belti*, and they have intermediate sculpture. While it is still possible that the Miami population represents a different species, I am not confident of that at present.

Some *alzatei* (Figs. 58-60, 99) specimens strongly resemble specimens of *belti* from Costa Rica in size, habitus, spine length, and sculpture, but *alzatei*: 1) is smaller (WL 0.52-0.65mm), 2) has a truncate clypeal apron in Central America, 3) has smaller eyes (11-14 facets), and 4) lacks erect hair on the scapes.

The geographic ranges of *creightoni* (Figs. 51-54, 95-96) and *belti* overlap in much of Central America and some members look quite similar in size, sculpture, and pilosity. Workers of *creightoni* can be distinguished by: 1) generally smaller, elliptical eyes with longer propodeal spines (< 19 facets; EL/SpL 0.29-0.64 vs. 0.62-1.23 in *belti*), 2) more horizontal propodeal spines, 3) promesonotal dorsum rugose to rugose-areolate, and 4) hair on mesosoma dorsum clearly sorting into two distinct kinds.

See discussions of *inermis*, *tonduzi*, *merenbergiana*, and *exsulans* for comparisons with other similar species.

Distribution.—*Rogeria beltii* is so far known from southern Mexico to the Canal Zone and southwest Colombia. Elevations range from 200m to 1500m in Mexico and 50m to 950m in Panama. Labels with ecological data show them collected in rain forest "in Philodendron," "frond sheaths on ground," leaf litter, around an epiphyte mat on a fallen branch, rotten wood, and in dead trees or branches on the ground. Jack Longino found a colony "nesting under loose bark of a still solid log fallen across trail." On another rotten log he lured workers from under the bark to a freshly killed tabanid (Longino, unpublished field notes).

Material Examined.—MEXICO: Vera Cruz State, Los Tuxtlas (P. S. Ward); Chiapas State, El Bosque (A. Newton). GUATEMALA: Bobas (W. M. Mann). BELIZE [=British Honduras]: Caves Branch (S. and J. Peck). HONDURAS: Progreso [or El Progreso] (W. M. Mann), Lancetilla and La Ceiba (W. L. Brown) [mouthparts, sting; 2 male genitalia]. EL SALVADOR: between Apopa and Nejapa (W. L. Brown). COSTA RICA: Miami (unknown collector) [mouthparts, sting] [USNM]; Heredia Province, (J. Longino); Santa Clara [=Limón?] Province, Hamburg Farm and Parismina Br. (F. Nevermann); Puntarenas Province, Manuel Antonio National Park and Reserva Biológica Carara (P. S. Ward), Osa Peninsula, Corcovado National Park (J. Longino; P. S. Ward). PANAMA: Chiriquí Mountains, Boquete (F. M.

Gaige); Cerro Campana (A. Newton); El Valle (H. S. Dybas); Canal Zone, Barro Colorado Island (J. Zetek; A. Newton). COLOMBIA: Nariño Department, La Guayacana (P. Silverstone) [LACM]. 117 workers, 15 queens, 5 males [CUIC, JTLC, LACM, MCZ, MZSP, USNM].

Rogeria inermis Mann

Figs. 40-42

Rogeria inermis Mann 1922:32, Fig. 15. Syntype workers, HONDURAS: Progreso, Lombardia (Mann) [MCZ] [3 of 5 syntypes examined].

Diagnosis.—WL 0.60-0.85mm. Clypeal apron medially emarginate. Eye oval, moderately large. Nuchal grooves weakly visible in lateral view. Propodeal spines short to absent. Propodeal spiracles rather large, prominent, face somewhat caudad, usually < 1/2 diameter from edge of infradental lamella. Promesonotal dorsum rugose to areolate-rugose; pronotal sides rugose, shiny. Scapes with erect hair. Head dorsum with erect hairs and shorter, decumbent pilosity. Hair on mesosoma and gaster T1 subdecumbent to erect; not two distinct kinds. Pilosity on gaster rather sparse. Extensor surfaces of tibiae with decumbent to suberect hairs.

Workers.—TL 2.2-3.0, HL 0.55-0.71, HW 0.48-0.63, SL 0.38-0.50, EL 0.09-0.13 (15-28 facets), PW 0.34-0.47, WL 0.60-0.85, SpL 0.03 (no spines)-0.10, PetL 0.25-0.37, PpetL 0.14-0.20mm, CI 0.82-0.91, OI 0.18-0.22, SI 0.73-0.88, PSI 0.04 (no spines)-0.14. N=15

Mandibles with 5 or 6 teeth, usually five decreasing in size basad then a large basal tooth. Palpal formula 3,2. Median clypeal apron weakly to strongly emarginate. Posterior outline of head convex. Metanotal groove weak to absent. Anterior edge of propodeum sometimes marked by a transverse ridge. Propodeal spines usually short and acute (Fig. 40), but may also be quite long (Fig. 41), blunt, or absent. Petiole (Fig. 40) with a distinct, rounded node; peduncle slender, venter with strong tooth, but little or no keel. Postpetiolar node highest in posterior half; shape in dorsal view subtrapezoidal as in Fig. 49. Anterior lip of postpetiolar sternum square, not protruding. Pygidium as in *creightoni*-group diagnosis.

Sting apparatus as in Fig. 42. Spiracular plates with incomplete medial connection; spiracle not enlarged. Anterodorsal corner of quadrate plate

prominent, with medial and lateral lobes. Oblong plate anterior apodeme long, slender; ventral arm tall, with long, slender fulcral arm. Gonostylus with dorsoterminal and companion setae; no gap between these and other sensilla. Lancets strong, acute, with a single minute apical barb. Sting shaft slender, straight; apex strong, acute, with low dorsal flange. Valve chamber and sting bulb large, subequal in height and length. Sting base much lower than bulb height, with weak anterolateral processes. Furcula an inverted Y-shape. See Kugler (1978b) for a more complete description.

Microsculpture on head and mesosoma reduced to vague irregularities in otherwise smooth and shiny interrugal spaces. Middorsum of head longitudinally rugose with lateral spurs, grading to areolate-rugose on laterodorsa and sides. Sculpture below and behind the eye sometimes vestigial, leaving a shiny area. Posterior head in most specimens transversely arching rugose (with lateral spurs) to areolate-rugose, but longitudinally rugose in two workers from the Osa Peninsula of Costa Rica. Rugae on mesosoma are sharp, with broad interrugal spaces that are even smoother and shinier than on the head. Anterior pronotum with 1-3 transverse rugae; disc with longitudinal rugae; meso- and metanotum vermiculate-rugose or areolate-rugose. Pronotal sides, mesopleura, and metapleura predominantly rugose; intervals very shiny. Dorsal face of propodeum transversely rugose to areolate. Sides of petiolar node weakly rugose to rugose-areolate, producing an uneven, shiny surface; apex smooth. Postpetiolar node largely smooth and shining with only slight unevenness of surface on sides.

Color varies from a reddish-brown (almost black) body with yellowish brown appendages to a yellowish-brown body with darker gaster and brownish-yellow appendages.

Queens.—TL 2.9-3.0, HL 0.62-0.64, HW 0.55-0.57, SL 0.41-0.45, EL 0.15-0.16, PW 0.47-0.48, WL 0.81-0.84, SPL 0.09, PetL 0.32-0.36, PpetL 0.18-0.19mm, CI 0.89, SI 0.74-0.79, PSI 0.11. N=3

Mandibles with 6 teeth, or 5 teeth and 2 denticles. Parapsidal furrows not discernible. Sculpture on posterior head of Panamanian specimens transversely rugose-areolate; more longitudinally oriented in Costa Rican specimens. Pronotum transversely rugose-areolate. Mesonotal sculpture predominantly rugose, with some closed cells. Dorsal face of propodeum transversely rugose.

Petiolar node with weak macrosculpture, postpetiole smooth.

Discussion.—The two specimens from the Osa Peninsula of Costa Rica differ from the other specimens in having noticeably longer propodeal spines and longitudinal, rather than transverse sculpture on the back of the head. These may be members of a sibling species, but spine length is quite variable in *inermis* (e.g. PSI 0.04-0.09 in one Berlese sample). Thus, I hesitate to name a new species until more specimens show consistent differences.

Rogeria leptonana (Figs. 66-70) from Cerro Pico Blanco, Costa Rica and Nueva California, Panama have reduced or absent propodeal spines, but differ from *inermis* in: 1) generally smaller size (WL 0.57-0.66mm; only 1 of 49 *inermis* workers with WL < 0.67mm), 2) smaller eye (6-8 facets; OI 0.11-0.12), and 3) mesosoma and gaster T1 dorsa with 2 distinct types of pilosity. *Rogeria belti* (Figs. 35-39, 91-92), often collected with *inermis*, has longer propodeal spines and more areolate head and pronotal sculpture. See also the *neilyensis* discussion.

Distribution.—All specimens are from Guatemala to Panama, at elevations from 10m to 1250m. Some were collected in fruit bat guano; others, in Berlese samples from rain forest leaf litter.

Material Examined.—GUATEMALA: Alta Verapaz Department, Lanquín (S. and J. Peck). HONDURAS: Progreso [or El Progresol]; Lombardia (W.M. Mann). COSTARICA: (A. Bierig; F. Nevermann); Heredia Province, Puerto Viejo, La Selva Field Station (C. Kugler; Talbot & VanDevender) [2stings]; Limón Province, Cahuita (P. S. Ward); Puntarenas Province, Osa Peninsula (S. Peck), Manuel Antonio National Park (P. S. Ward), Carara Biological Reserve (P. S. Ward); Cartago Province, Turrialba vicinity (A. Bierig) (W. L. Brown) [mouthparts, sting]. PANAMA: Bocas del Toro, 3 localities (D. M. Olson); Barro Colorado Island (W. L. Brown and E.S. McCluskey [mouthparts, whole specimen]; N. A. Weber; J. Zetek); Gamboa (P. S. Ward); Panama City (W. L. Brown). 49 workers, 3 queens [CKC, CUC, LACM, MCZ, MZSP, USNM].

Rogeria neilyensis new species Fig. 43

Diagnosis.—WL 0.75-0.76mm. Clypeal apron convex, with weak median angle. Eye small.

Nuchal groove makes a deep notch in lateral view of head. Propodeal spines short, wide. Propodeal spiracles ≥ 1 diameter from edge of infradental lamella. Postpetiolar sternum not enlarged. Terminal segments of gaster rotated ventrad. Sides of head with distinct areolate-rugose to rugose macrosculpture; mesosoma predominantly rugose. Scapes and legs lack erect hairs. Head dorsum with short, dense, decumbent pilosity and longer, more sparse, erect-suberect hairs. Mesosoma hairs range continuously from short, decumbent to long, erect (i.e. not sorting into two distinct kinds as on head.). Hair on gaster T1 dense, subdecumbent-suberect (decumbent hairs few or absent).

Holotype and Paratype Workers.— TL 2.8-2.9 (2.8), HL 0.66-0.68 (0.67), HW 0.58-0.60 (0.59), SL 0.45, EL 0.06-0.07 (0.06) (9-13 facets), PW 0.42-0.43 (0.42), WL 0.75-0.76 (0.75), SpL 0.08-0.10 (0.08), PetL 0.30-0.34 (0.30), PpetL 0.18-0.19 (0.18) mm, CI 0.88-0.89 (0.88), OI 0.10-0.12 (0.10), SI 0.76-0.77 (0.76), PSI 0.11-0.13 (0.11), MHI 0.96-1.00 (0.96). N=2

Mandible 6-toothed; basal tooth larger than penultimate tooth. On left mandible, fifth tooth replaced by 2 denticles. Body of clypeus slightly prominent. Frontal lobes rather wide (FLW/HW 0.43-0.44). Anteroventral corner of pronotum projecting tooth-like. No distinct metanotal groove. Propodeal spiracles moderately large, weakly bulging from sides. Metapleural lobes low, broadly rounded. Petiolar peduncle with large ventral keel and tooth. Postpetiolar node lacking a distinct posterior face; subtrapezoidal from above, as in Fig. 50.

Longitudinal rugae on frontal lobes become areolate-rugose half way to back of head. Posterior head transversely areolate-rugose. Laterodorsa areolate-rugose. Intervals in macrosculpture of head shiny, but wrinkled by vague, irregular microsculpture. Anterior edge of pronotal disc areolate; rest of promesonotal dorsum longitudinally rugose-areolate; more rugose mesad, more areolate laterad. Dorsal face of propodeum transversely rugose. Intervals on mesosoma generally wider and smoother than on head. Petiolar node vaguely areolate; posterior face and peduncle with longitudinal carinae. Surface of postpetiolar node uneven, but predominantly smooth and shiny. Gaster T1 and S1 smooth and shiny, but other segments progressively dulled caudad by dense microareolate sculpture.

Color yellowish-brown, with slightly more yellowish appendages and anterior of head; first tergum of gaster dark brown.

Discussion.—This species is similar in size and reduced petiolar spines to another Central American species, *inermis* (Figs. 40-42), which differs as follows: 1) clypeal apron medially emarginate, 2) nuchal groove weak, 3) eyes larger (OI 0.18-0.22; 15-28 facets), 4) propodeal spiracle ≤ 1 diameter from edge of propodeum, 5) scapes with erect hair, and 6) mesosoma and gaster T1 with little, if any, decumbent hair.

The *leptonana* (Figs. 66-70) specimens from Cerro Pico Blanco, Costa Rica, have low, wide propodeal spines like *neilyensis*, but *leptonana* has: 1) an emarginate clypeus, 2) weak nuchal grooves, 3) lower lower mesosoma profile (MHI 0.84-0.90), and 4) scapes with erect hair.

The name *neilyensis* refers to the type locality.

Material examined.—**Holotype locality.** COSTA RICA: Puntarenas Province, 3km N Ciudad Neily [=Villa Neily], 8.41N 82.57W, 210m, 31-VII-1985, #7771-5 (P. S. Ward). From sifted litter (leaf mold and rotten wood) in second-growth rain forest [MCZ].

Paratype locality. 2 workers, holotype locality [LACM, MCZ].

Rogeria exsulans Wilson and Taylor

Fig. 44

Rogeria exsulans Wilson and Taylor 1967:74, Fig. 60. Holotype worker, SAMOA: Upolu (T. E. Woodward) [Holotype MCZ; paratypes ANIC, MCZ] [Holotype and 30 paratypes examined].

Diagnosis.—WL 0.68-0.84mm. Eye fairly large, oval. Propodeal spiracle faces posterolaterally. Petiole with lamellate keel and dentate inferior process. Terminal segments of gaster rotated ventrad. Sides of head areolate-rugose; posterior head and promesonotum strongly areolate. Scapes with decumbent and a few short, suberect hairs. No erect hair on extensor surfaces of legs. Mostly abundant decumbent to subdecumbent hair on dorsa of head, mesosoma, nodes and gaster T1 (sparse erect hair on head and mesosoma); not sorting into two distinct kinds of pilosity.

Workers.— TL 2.5-3.0, HL 0.62-0.71, HW 0.52-0.64, EL 0.08-0.11 (20-26 facets), PW 0.37-0.45, WL 0.68-0.84, SpL 0.10-0.15, PetL 0.26-0.33, PpetL 0.15-0.17mm, CI 0.84-0.90, OI 0.19-0.21, SI 0.81-0.85, PSI

0.14-0.19. N=4

Some mandibles with 6 teeth (5 decreasing in size then a large basal), but usually the small penultimate basal tooth is replaced by 2 denticles, or by a gap and 1 denticle. Palpal formula 3,2. Clypeal apron medially emarginate. Back of head in dorsal view convex or flat medially; temples broadly rounded (Wilson and Taylor's Fig. 60). Promesonotal profile may be evenly rounded, but more often angular (Fig. 44). Metanotal groove usually distinct, producing a step between promesonotum and propodeum, but weak in two specimens. Propodeal spiracles more than one diameter from nearest edge of infradental lamella. Node short, evenly convex. Postpetiolar sternum relatively long, flat; postpetiole from above subtrapezoidal, as in Fig. 51. Sting apparatus as in *creightoni*-group diagnosis.

Longitudinal rugae of frontal lobes and median head gradually change to strongly areolate on posterior head. Cheeks and laterodorsa longitudinally areolate-rugose. Intervals on head dorsum vaguely undulate, but shiny; intervals on sides and posterior head smooth and shiny. Promesonotum for the most part strongly areolate, but several elongate cells may occupy the midline of the pronotal disc, and often the pronotal sides have weaker areolate sculpture. Meso- and metapleura confused areolate-rugose. Mesosoma microsculpture reduced; intervals in macrosculpture uneven, but very shiny. Petiolar node with weak to vestigial areolate macrosculpture and vague microareolate background. Postpetiolar node shiny, nearly smooth throughout.

Head, mesosoma dark reddish-brown, waist and anterior and posterior ends of gaster somewhat lighter. Mandibles, clypeus, antennae, and legs yellowish-brown.

Discussion.—The only other Pacific species, *stigmatica* and *megastigmatica* are easily distinguished from *exsulans* by their lack of a petiolar keel and inferior process, as well as other features listed in the diagnoses.

The species most similar to *exsulans* is Central American. *Rogeria belti* has some members with similar size, habitus, eye size, clypeus shape, a distinct petiolar keel, strong areolate sculpture, and intergrading types of hairs on mesosoma. However, *belti* workers still differ in having generally longer propodeal spines (PSI 0.19-0.24), less prominent petiolar keel, and distinct long/erect

and short/decumbent pilosity on the gaster.

Distribution.—*Rogeria exsulans* has been collected only at 600-700m on a single island in the middle of the South Pacific. Most collections specify a rain forest habitat, where it has been found under dead bark, in rotten logs, in moss and ferns on trees and in berlesate of moss on logs and tree trunks.

Material Examined.—WESTERN SAMOA: Upolu, Afiamalu (T. E. Woodward; R. W. Taylor; E. C. Zimmerman) [2 mouthparts, stings]. 31 workers [MCZ].

***Rogeria cornuta* new species**

Fig. 45

Diagnosis.—WL 0.93-1.02mm. Eye relatively small. Nuchal groove makes strong notch in lateral view of head. Propodeal spines very long (EL/SpL < 0.50); not inclined dorsad; distal portions subparallel with midline. Propodeal spiracles prominent, less than 1/2 diameter from edge of infradental lamella. Metapleural lobes prominent. Petiole with little or no keel. Sides and posterior head strongly areolate; mesosoma predominantly rugose. Erect hair on scapes. Gaster T1 lacks decumbent hair.

Holotype and Paratype Workers.—TL (3.5)-3.8, HL (0.80)-0.89, HW (0.73)-0.78, SL (0.55)-0.58, EL 0.10 (16-18 facets), PW (0.55)-0.60, WL (0.93)-1.02, SpL (0.25)-0.27, PetL (0.42)-0.45, PpetL (0.21)-0.24mm, CI 0.88-(0.92), OI 0.13-(0.14), SI 0.74-(0.75), PSI 0.26-(0.27), MHI (0.98)-1.02.

Mandible with 6 teeth; basal larger than penultimate basal. Clypeal apron medially emarginate; body of clypeus projecting slightly over apron. Posterior outline of head broadly and weakly concave. Sides of pronotum with anterior grooves for insertion of corners of head; shoulders from above angular. No meso- or metanotal grooves. Paratype promesonotal dorsum less convex and more angular in front and back than shown for holotype (Fig. 45). Propodeal directed caudad so that a bisecting line would extend just below shoulder; distal half of spines curve inward, almost paralleling the midline. Postpetiolar node somewhat flattened on top; subtrapezoidal in dorsal view. Postpetiolar node of paratype lower in front than behind. Postpetiolar sternum long, not projecting anteriorly.

Head macrosculpture coarse (especially be-

hind), with sharp ridges and shiny interstices. Longitudinal rugae on front break up at midlength of head and give way to a transversely arching areolate-rugose pattern on the posterior head. Laterodorsa confused rugose-areolate. Mesosoma macrosculpture also coarse with smooth interstices, but ridges are rounded. Anterior face of pronotum transversely rugose-areolate, pronotal disc longitudinally rugose to vermiculate-rugose (holotype). Mesonotum vermiculate-rugose with some cross-ridges. Pronotal sides areolate-rugose (holotype) or broken and confused; rest of sides confusedly longitudinally rugose with few connecting ridges. Anterior edge of propodeum marked by a sharp transverse ridge. Petiolar node weakly areolate on sides and posterior; smooth along anterior and dorsal midline. Postpetiolar node weakly areolate on sides; smooth along midline.

Scapes, head dorsum and tibiae with short decumbent and long erect-suberect hair. Hair on mesosoma and waist ranges from decumbent to erect and varies in length, but not clearly segregated into two distinct types. Hair on gaster erect-suberect.

Color dark reddish-brown, with lighter frontoclypeal area and ends of gaster; legs and antennae yellowish-brown.

Discussion.—Some *creightoni*, also from Belize, have the same habitus as *cornuta*, including long, horizontal propodeal spines, but these *creightoni* members are much smaller (WL 0.63-0.71mm) and have abundant decumbent pilosity on the gaster T1. Other *creightoni* from La Selva, Costa Rica are the same size as the *cornuta* holotype, but have shorter propodeal spines, slightly smaller eyes, and abundant decumbent pilosity on the gaster T1.

The name *cornuta* means horned, referring to the long, horn-like propodeal spines.

Material Examined.—**Holotype locality.** BELIZE (British Honduras): 2.5 mi. S Belmopan, 4-VIII-1972, S. and J. Peck, #242 [MZSP].

Paratype locality. 1 worker, MEXICO: Chiapas State, Ocosingo, 2-VI-1967, J. M. Campbell [MCZ].

Curvipubens-Group and Related Species

Rogeria curvipubens Emery

Figs. 74-76, 101-102

Rogeria curvipubens Emery 1894:190. Worker and queen syntypes, U. S. VIRGIN ISLANDS: St. Thomas (Eggers) [MCSN] [Worker syntype examined].

Additions to *curvipubens*-group diagnosis. Postpetiolar node strongly vaulted and with small posterior peduncle. Anterior edge of postpetiolar sternum not strongly produced; junction of posterior and ventral edges angular (Fig. 75). Sting shaft and lancets weak, spatulate. Sides of head smooth and shiny. Promesonotum with vestigial microsculpture, making interrugal spaces nearly smooth and weakly to strongly shiny. Dorsal face of propodeum usually with 1-5 transverse rugulae.

Workers.— TL 1.9-2.3, HL 0.48-0.58, HW 0.38-0.49, SL 0.32-0.39, EL 0.04-0.07 (4-11 facets), PW 0.28-0.38, WL 0.50-0.63, SpL 0.05-0.11, PetL 0.20-0.24, PpetL 0.10-0.13mm, CI 0.80-0.86, OI 0.10-0.15, SI 0.77-0.81, PS1 0.13-0.18, MHI 0.84-1.05. N=22

Mandibles typically with 6 teeth, but occasionally with an additional denticle or tooth; basal tooth little if any larger than penultimate basal. Haitian specimens with 5 teeth. Anterior edge of clypeus evenly convex or with median concavity (Haiti). Body of clypeus, though not especially prominent, is generally the anteriormost point of the head in full dorsal view; little or no shelf-like apron. Posterior outline of head generally broadly convex, but sometimes with a weak median concavity (Fig. 74). Nuchal groove weak. Eye small, elliptical. Pronotum weakly angular or rounded in front and on sides. Metanotal groove absent or suggested by a broad, very shallow impression. Anterior propodeum marked by transverse carinula that often does not interrupt mesosoma profile. Propodeal spines short, wide, with curved (Fig. 74) or straight edges; a bisecting line passes below the anteroventral corner of pronotum. Metapleural lobes low, subangular to rounded. Sting apparatus like that of *inermis* (Fig. 42) in most respects, but lancets and sting shaft are weak and the lancets are blunt and spatulate. Though twisted in all preparations, the sting shaft does seem to have a dorsoterminal flange.

Posterior head transversely arching rugose to rugose-areolate, intervals shiny (Fig. 101). Most of

head with vague microsculpture. Anterior edge of pronotal disc areolate to rugose-areolate; disc longitudinally rugose (Fig. 102), sometimes effaced on meso- and metanota. Pronotal sides with one or more weak longitudinal rugae; meso- and metapleura confused rugose to rugose-areolate. Petiole and postpetiole microareolate and devoid of macrosculpture, except for small carinulae on petiolar peduncle of some specimens. Microsculpture weaker on apices of nodes, especially postpetiolar node, which is shiny and nearly smooth.

Head with 0-6 short suberect hairs; mesosoma dorsum with 2-7 pairs. Extent of erect pilosity on gaster T1 variable; usually covering whole surface, but may cover as little as the posterior third.

Color uniformly yellow, to golden or light brown body with lighter appendages, frontoclypeal region and ventral gaster.

Queens.—TL 2.3-2.6, HL 0.51-0.59, HW 0.44-0.51, SL 0.34-0.39, EL 0.09-0.12, PW 0.38-0.45, WL 0.63-0.71, SpL 0.11-0.14, PetL 0.22-0.27, PpetL 0.12-0.15mm, CI 0.83-0.90, SI 0.73-0.78, PSI 0.16-0.19, MHI 0.96-1.17. N=6

Queens (Fig. 76) vary like workers in shapes of head, propodeal spines, petiole and postpetiole. Mandibles have 6 teeth in most; plus 2 denticles in the Guatemalan specimen. Parapsidal furrows weak or indistinguishable. Wing venation as in *belti* (Fig. 37). Sting apparatus of a queen from the north coast of Colombia like that of workers from the region, including spatulate lancets. Sculpture, pilosity, and color also vary similarly. Sides of head may be partly rugose, but some portion smooth. Pro-, meso-, and metanota rugose. Meso- and metapleura longitudinally rugose dorsad; anterior half of mesokatepisterna very smooth and shiny. Microsculpture as in workers. Numbers of erect hairs on various parts range as in workers, except for one queen with 10 pairs on mesosoma dorsum.

Queens from Mexico and Guatemala are not associated with workers. Moreover, the Guatemalan specimen lacks a postpetiole and gaster. Both have the side of the head rather strongly rugose-areolate, but I am guessing that they are *curvipubens*, rather than *cuneola* on the basis of the strongly shiny mesokatepisterna and shape of the postpetiolar sternum of the Mexican specimen.

Discussion.—Workers come from the Caribbean Islands and northern South America. How-

ever, if the two queens from Mexico and Guatemala are in fact *curvipubens*, the range of *curvipubens* broadly overlaps that of sister species *cuneola*. The two species are distinguished by characters in the *cuneola* diagnosis and description.

Rogeria alzatei (Figs. 58-60, 99) and *leptonana* (Figs. 66-70) are very similar to *curvipubens* and *cuneola* and have been considered *curvipubens* in the past, but I believe they can be distinguished, usually by general habitus, but especially by more abundant erect pilosity than described in the *curvipubens*-group diagnosis. Moreover, side-by-side comparisons of sympatric specimens from the Villavicencio vicinity of Colombia and from Barro Colorado Island reveal more differences: the *alzatei* specimens have a truncate clypeal apron, narrower propodeal spines, and generally stronger sculpture. The *leptonana* specimens have an emarginate clypeal apron, lower mesosoma, and larger petiolar keel. The only question of identity arises on the north coast of Colombia, where a single specimen has wider propodeal spines and convex clypeus like *curvipubens*, which are common in the area, but has the abundant pilosity and stronger macrosculpture of *alzatei*. I call that specimen *alzatei*, since spine and clypeal shapes vary in that species.

Assigning stray queens has also been problematic. In two localities on the north coast of Colombia (Pueblito, Tayrona Park; Don Diego, Guajira) I collected three distinct kinds of queens. One set has a distinctly lower mesosoma (MHI 0.92-0.97) and larger petiolar keel than the other two and has abundant erect pilosity on scapes, whole head, mesosoma, waist, and gaster. These and other characters suggest those are *leptonana* queens. The other two kinds of queens have a more compact mesosoma (MHI 1.05-1.22), but one set has no erect hair on scapes, head, waist, or first tergum of gaster, little or no erect hair on the mesosoma dorsum, more effaced sculpture with nearly smooth sides of head and transversely arching rugae on posterior head, and spatulate lancets, just like the *curvipubens* workers that are common in both areas. The third set of queens have distinct macrosculpture, distinctly areolate sides and posterior head, short erect hair on the whole head dorsum and more abundant erect/suberect hair on mesosoma, waist and gaster and acute lancets. I have tentatively assigned them to *innotabilis* because of their evenly convex clypeus and

posteroventral spine on the spiracular plate of the sting apparatus.

See also *micromma*, and *tribrocea* discussions.

Distribution.—*Rogeria curvipubens* has been collected in by Berlese sampling in tropical rain forest, secondary growth forest, and dry tropical forest. Collection sites have all been below 500m elevation.

Material Examined.—VIRGIN ISLANDS: St. Thomas (Eggers; Balzan); St. Croix (I. Proj. staff). HAITI: Aquin (no collector). JAMAICA: St. Elizabeth Parish, Black River (no collector). MEXICO: Vera Cruz, Cuatatolapan (M. Abarca). GUATEMALA: Alta Verapaz, Trece Aguas (Schwarz and Barber). PANAMA: Barro Colorado Island (N. A. Weber; W. L. Brown). COLOMBIA: Guajira, Serrania de Macuira and vicinity Río Don Diego (W. L. Brown and C. Kugler) [1 mouthparts, 2 stings, 1 whole specimen slide mounted]; Magdalena Department, Tigrera near Santa Marta (W. L. Brown and C. Kugler), Tayrona National Park (C. Kugler) [worker and queen mouthparts, sting]; Meta Department, Caño El Buque near Villavicencio (Kugler). VENEZUELA: Bolívar State, Campamento Río Grande (P. S. Ward); Monagas State, Parque de Laguna Grande (P. F. Kukuk). SURINAM: Tambahredjo [queen sting], Sidoredjo [sting], Dirkshoop, and La Pouille (I. van der Drift). 57 workers, 13 queens [BMNH, CKC, CUIC, LACM, MCZ, MZSP, USNM].

Rogeria cuneola new species

Figs. 77-78, 103

Additions to *curvipubens*-group diagnosis. Postpetiolar node weakly vaulted and with no posterior peduncle. Anterior edge of sternum strongly produced; posterior and ventral edges merge insensibly (Fig. 78). Sting shaft and lancets strong, acute; sting shaft with dorsal flange; lancet with barbule. Sides of head and mesosoma with strong microareolate sculpture that obscures weak macrosculpture and makes intervals opaque. Dorsal face of propodeum without transverse rugulae.

Holotype and Paratype Workers.— TL 2.0-2.1 (2.0), HL 0.50-0.54 (0.51), HW 0.43-0.46 (0.43), SL 0.32-0.35 (0.33), EL 0.05-0.06 (0.05) (6-7 facets), PW 0.31-0.33 (0.31), WL 0.51-0.56 (0.52), SpL 0.07-0.09 (0.08), PetL 0.20-0.22 (0.20), PpetL 0.10-0.12 (0.11)mm, CI 0.84-0.87 (0.84), OI 0.10-0.13 (0.13), SI 0.73-0.78 (0.77), PSI 0.15-0.17, MHI 0.94-1.02 (1.02). N=7

Nontype Workers.—TL 2.0-2.3, HL 0.50-0.56, HW 0.43-0.48, SL 0.31-0.36, EL 0.04-0.06 (5-10 facets), PW 0.30-0.37, WL 0.52-0.60, SpL 0.07-0.10, PetL 0.21-0.24, PpetL 0.11-0.13mm, CI 0.83-0.86, OI 0.10-0.13, SI 0.72-0.78, PSI 0.14-0.17, MHI 0.93-1.03. N=9

Like *curvipubens*, but differing in the following ways in addition to diagnosis. Relative widths of nodes with slightly different ranges (PetW/PetL 0.56-0.70); PpetW/PpetL 1.38-1.52). Sting apparatus of specimens from Oaxaca (paratypes) and Vera Cruz, Mexico with strong, acute sting shaft and lancets as in *inermis* (Fig. 42).

Posterior head with transversely arching rugose-areolate macrosculpture. Compared to *curvipubens*, rugae on mesosoma dorsum with more lateral spurs that may connect rugae and create areolae on anterior pronotum and on metanotum. Macrosculpture on mesosoma sides absent or weakly rugose-areolate. Dorsal face of propodeum lacks macrosculpture.

Head dorsum with 0-16 hairs suberect hairs; mesosoma dorsum with 1-8 pairs (usually 2-7). Erect hair on gaster T1 usually limited to posterior margin, but entirely absent from Jalisco specimen and entirely covering the tergum of the Yucatán specimen. The Yucatán specimen is also unique in having some stiff, spatulate hairs on head, mesosoma and gaster.

Paratype and Nontype Queens.—TL 2.3-2.5, HL 0.53-0.56, HW 0.45-0.50, SL 0.35-0.38, EL 0.10-0.11, PW 0.39-0.45, WL 0.65-0.72, SpL 0.11-0.14, PetL 0.22-0.25, PpetL 0.13-0.15mm, CI 0.85-0.89, SI 0.76-0.78, PSI 0.16-0.19. N=2

Queen as in *curvipubens*, except for shape of postpetiole, sting, and sculpture as in workers of *cuneola*. Mandibles with 6 or 7 teeth. Sides of head and mesokatepisterna strongly microareolate and opaque. Paratype queen with erect-suberect hair over whole gaster T1.

Discussion.—See *micromma* and *minima* discussions for comparisons with other tiny *Rogeria*. The name *cuneola* (L., small wedge) refers to the shape of the postpetiolar sternum in lateral view.

Distribution.—These tiny ants are most often taken in berlesate of leaf litter and rotten wood. Some come from siftings under termite mounds and one was collected in a *Cattelya* orchid. Habitat of most specimens is rain forest or mesic forest, either primary or secondary growth, but one specimen was found in Yucatán thorn forest.

Material Examined.—**Holotype locality.** MEXICO: Oaxaca State, 1 mi. E Reforma, 15-VIII-1973, litter, tropical evergreen forest (A. Newton) [MCZ].

Paratype localities. MEXICO: 14 workers, holotype locality [BMNH, CKC, LACM, MCZ, MZSP, USMN]; 1 worker, 1 queen, Oaxaca State, 1 mi. E Reforma, near Tuxtepec, 12-15-VIII-1973, litter forest floor (A. Newton) [3 stings, 1 worker coated for SEM] [MCZ].

Nontype localities. MEXICO: 1 worker, San Luis Potosí State, El Salto, 6-VII-1969, #B-166 (S. and J. Peck) [MCZ]; 2 workers, Vera Cruz State, Pueblo Nuevo near Tetzonapa, 17-VIII-1953, #B.F. (E. O. Wilson) [MCZ]; 2 workers, Vera Cruz State, El Palmar near Tetzonapa, 8-VIII-1953, #173 (E. O. Wilson) [sting, whole specimen] [MCZ]; 1 worker, Jalisco State, 6km N El Tuito, 31-XII-1987, #9327-6 (P. S. Ward) [MCZ]; 7 workers, 1 queen, Chiapas State, Palenque, 4-IX-1974 (E. M. and J. L. Fisher) [LACM]; 1 worker, Yucatán State, Uxmal, 27-VII-1963, #118 (E. O. Wilson) [MCZ]. BELIZE: 4 workers, Belmopan, 1-15-VIII-1972, #B-243 (S. and J. Peck). GUATEMALA: 1 worker, 14-15-V-1946[?], SF-21214, 46-6134 (no locality or collector) [USNM]. HONDURAS: 2 workers, La Lima, 4-IX-1961, UCF 217-128 (C. Evers Q.) [MZSP]. COSTA RICA: 1 worker, Guanacaste Province, Santa Rosa National Park, 14-VII-1983 (P. S. Ward) [CKC]; 3 workers, Puntarenas Province, Manuel Antonio National Park, 27-VII-1985, #7692-9 (P. S. Ward) [MCZ].

Rogeria micromma Kempf

Fig. 71

Rogeria micromma Kempf 1961:509 (Figs. 12-13). Holotype worker, SURINAM: Dirkshoop (J. van der Drift) [MZSP] [Holotype and La Poulle paratype examined].

Diagnosis.—WL 0.45-0.52mm. Clypeal apron medially flattened. Eye tiny. Postpetiolar node subrectangular in dorsal view and not strongly vaulted in side view; anterior lip of sternum not prominent, posterior edge angular in side view. Sides of head and mesosoma and dorsal face of propodeum opaque with dense microareolate sculpture. Laterodorsa and sides of head also finely macroareolate. Propodeum free of macrosulpture. No erect hair on scapes or extensor surfaces of legs. Dorsa of head, mesosoma, nodes and gaster T1 with short, appressed hairs and longer, erect to suberect hairs. Mesosoma dorsum with 8-10 pairs

of erect hair; each node with 2 pairs of posterodorsally projecting hairs.

Workers.—TL 1.7-1.8, HL 0.44-0.51, HW 0.37-0.45, SL 0.28-0.35, EL 0.02-0.04 (2-5 facets), PW 0.28-0.30, WL 0.45-0.52, SpL 0.07-0.08, PetL 0.17-0.18, PetW 0.10-0.13, PpetL 0.10-0.11, PpetW 0.13-0.15mm, CI 0.84-0.88, OI 0.05-0.08, SI 0.76-0.79, PSI 0.15-0.16, MHI 0.92-0.96. N=3

The following supplements diagnosis and Kempf (1961). Mandibles 5-toothed to 6-toothed; basal tooth not larger than penultimate basal. Mesosoma profile of holotype interrupted by a weak metanotal groove followed by two transverse carinulae, but profiles of La Poulle and Brazil specimens uninterrupted. Brazil specimen with narrower propodeal spines than in types, and propodeal spiracle closer to posterior edge of propodeum. Petiole short (PetL//WL 0.35-0.38), with ventral keel and tooth.

In Surinam specimens, vague microareolate microsculpture densely covers head, dorsum of mesosoma, dorsal face of propodeum, petiole and postpetiole of types, producing a weakly shining, granular appearance. Brazil specimen similar, except for smoother ventral petiolar peduncle and postpetiolar dorsum. Sides of mesosoma and posterior surface of head more distinctly microareolate. Anterior of pronotal disc with 1 to 2 transverse rugae followed by longitudinally rugose to areolate-rugose macrosulpture that disappears into microsculpture on meso- and metanota. Sides of mesosoma with sparse, faint longitudinal rugulae on meso- and metapleura. Nodes microareolate; more effaced on postpetiole.

Erect hairs of Dirkshoop specimen all trichoid; but thicker and stiff on the La Poulle specimen, at least some cuneate; erect hairs on the Belém specimen seem intermediate.

Color brownish-yellow; legs, mandibles and antennae sometimes slightly lighter. Frontoclypeal region not lighter than rest of head.

Discussion.—It may be that the three *micromma* specimens are just unusual *curvipubens* or *cuneola*, but at present there are enough differences to provisionally retain this species. Eighteen *curvipubens* (Figs. 74-76, 101-102) workers from other van der Drift collections in Dirkshoop and La Poulle, are very similar to *micromma* in size and shape, but differ as follows: 1) clypeal apron evenly convex, 2) sides of head and mesosoma shinier with effaced microsculpture, 3) sides of head with

rugose macrosculpture, and 4) reduced pilosity.

Some *cuneola* (Figs. 77-78, 103) specimens are also very similar to *micromima* in shape and size, and one from Yucatán has stiff erect hairs on head, mesosoma, waist and gaster T1, but *cuneola* workers differ in shape of the postpetiolar sternum, as well as in clypeal shape and pilosity.

Some *alzatei* from Panama, Colombia, Guyana, and French Guiana are only slightly larger (WL 0.51-0.68mm) than *micromima* and have the same pilosity and similar structure and sculpture, but they generally have distinctly larger eyes with more than 10 facets, have a higher, more compact mesosoma (MHI 1.00-1.04), and generally narrower propodeal spines. Several *alzatei* from northern Colombia have reduced eyes (7-8 facets) and one has wider propodeal spines, but those Colombian ants are larger, have a higher mesosoma, and more abundant erect pilosity. See also the *minima* discussion.

Material Examined.—SURINAM: Dirkshoop (J. van der Drift), La Poulle (J. van der Drift). BRAZIL: Pará, Pirelli Plantation (Iriboca) nr. Belém, (W. L. Brown). 3 workers [MCZ, MZSP].

Rogeria minima Kusnezov Figs. 72-73

Rogeria minima Kusnezov 1958:44, Figs. 1-3. Holotype dealate queen, ARGENTINA: Tucumán [FML] [Holotype examined].

Known only from a single queen mounted on a microscope slide showing dorsal head (nearly split in half lengthwise), ventral maxillae and labium, lateral mesosoma and petiole, and a mostly ventral view of postpetiole and gaster.

Diagnosis.—WL of worker probably <0.60mm. Mandibles triangular. Palpal formula 2,1. Sting shaft and lancets spatulate. Postpetiole widest in anterior half; anterior lip of sternum not prominent. Mesosoma predominantly rugose. No microsculpture on head dorsum, little on mesosoma sides; but microareolate sculpture present on gaster T1 and S1. No erect hairs on scapes or extensor surfaces of legs. Head dorsum with abundant erect hair; mesosoma dorsum with more than 12 pairs; petiolar node with 2 pair projecting posterodorsally. Most erect hairs cuneate-fimbriate.

Queen.—TL 2.3, HL 0.55, HW 0.53, SL 0.34, EL 0.10, WL 0.65, SpL 0.12, PetL 0.22, PpetL 0.11mm, CI 0.96, SI 0.64, PSI 0.18.

Mandibles with 5 teeth; basal only slightly larger than penultimate basal. Palpal formula 2,1. Clypeus torn; shape of apron unclear. Eyes moderately large, with about 20 facets. Mesosoma as shown in Fig. 72. Parapsidal furrows cannot be discerned. Petiole with ventral tooth and nonlamellate keel. Postpetiole wider (0.18mm) than long; sides of postpetiole seem to be convex in front, then tapered, as in many *curvipubens* (Fig. 74); sternum seems low and not prominent or wedge-shaped. Pygidial gland sculpture present, no tubercles on posterior surface. What is visible of the sting apparatus looks like that of *inermis* (Fig. 42), except that lancet apices lack barbules and sting shaft seems to have little, if any, terminal flange. Since both sting shaft and lancets are folded, they are probably weakly sclerotized.

Median head with diverging rugae continuing on posterior head as diverging rugose-areolate sculpture; laterodorsa areolate-rugose. No macrosculpture on median pronotum; sides weakly and incompletely areolate, especially ventrad. Mesonotum longitudinally rugose. Dorsal half of mesopleura longitudinally rugose; most of mesokatepisterna smooth, but with some weak areolate sculpture along posterior margins. Metapleural and propodeal sides confused areolate-rugose. Mesosoma lacks microsculpture, except on median pronotum, sides of propodeal spines, and metapleural lobes (metanotum and median propodeum could not be examined). All surfaces of petiole, at least venter and sides of postpetiole, and at least sterna of gaster minutely and shallowly areolate with sharp, thin partitions. Much of dorsal aspect of gaster difficult to see, but at least anterior and lateral portions of T1, and the terminal terga are also shallowly microareolate.

Body covered with appressed to decumbent setiform pilosity. In addition, dorsa of head, mesosoma nodes, and gaster T1 and S1 with erect cuneate-fimbriate hairs (Fig. 73). Mesosoma dorsum with more than 12 pairs of erect hairs; petiolar node with 2 pairs of posterodorsally projecting erect hairs (postpetiolar hairs hidden). All hair on terminal segments of gaster are setiform.

Discussion.—A worker of *micromima* from La Poulle, Surinam and a worker of *cuneola* from Uxmal, Yucatán come very close in size, sculpture, and in having cuneate pilosity, but the gasters of both are smooth except for piligerous punctures. I cannot tell if any hairs are fimbriate.

Foreli-Group

Rogeria foreli Emery
Figs. 79-82, 104-105

Rogeria foreli Emery 1894:191. Holotype worker, VIRGIN ISLANDS: St. Thomas (Eggers) [MHN] [Holotype examined].

Rogeria foreli gaigei Forel 1914:617. Holotype worker, COLOMBIA (Gaige) [MHN] [Holotype examined]. N. syn.

Rogeria huachucana Snelling 1973:4, Fig. 1. Holotype and paratype worker, USA: Arizona, Cochise County (Snelling) [LACM] [Holotype and 1 paratype examined]. N. syn.

Additions to *foreli*-group diagnosis. Basal mandibular teeth abruptly smaller than apical teeth. Clypeal apron convex, often with a faint median angle. Eyes usually 10 or more facets.

Workers.—TL 1.9-2.9, HL 0.50-0.71, HW 0.43-0.62, SL 0.32-0.51, EL 0.06-0.10 (7-20 facets), PW 0.30-0.45, WL 0.50-0.80, SpL 0.07-0.15, PetL 0.20-0.32, PpetL 0.12-0.19mm, CI 0.83-0.89, SI 0.74-0.85, OI 0.12-0.17, PSI 0.14-0.20. N=25

Mandibles with 4-7 teeth and 0-3 denticles. Generally teeth 1-4 decrease in size gradually, then teeth 5-7 (if present) abruptly smaller and possibly interspersed with one or more denticles. Sometimes basal tooth is distinctly larger than penultimate tooth. Body of clypeus often projecting slightly over the anterior clypeal margin. Posterior outline of head flat to weakly convex. Eyes small, oval. Nuchal grooves inconspicuous in lateral view. Pronotal shoulders well rounded. Metanotal groove generally absent (Fig. 79), but may be weakly to distinctly (Fig. 80) visible. Anterior border of propodeum not marked by a ridge. Metapleural lobes small, broadly rounded. Petiolar node shape varies between extremes shown in Figs. 79 and 81; smaller nodes are as long as wide, larger nodes are longer than wide. Postpetiolar node peaks in posterior half; subrectangular in dorsal view. Anterior lip of postpetiolar sternum small (Fig. 79), or prominent (Figs. 81, 104).

Mandibles, median clypeus, legs, posterior face of propodeum, gaster, and sometimes sides of petiolar peduncle smooth, except for minute piligerous punctures. Rest of body densely microareolate or microcolliculate, often appearing granular at low magnification. Microareolate sculpture on head is more distinct near antennal insertions and more effaced caudad, sometimes

nearly smooth on sides of head. Microareolate pattern distinct on meso- and metapleura and generally on dorsal face of propodeum; indistinct on promesonotum and petiole and vestigial on postpetiole (Figs. 104-105). Microsculpture overlain by very fine longitudinal rugulae on lateral clypeus, cheeks, frontal lobes, middorsum and sometimes laterodorsa; posterior head with very fine transverse or diverging rugulae.

Color yellow with a slightly brownish gaster to chestnut-brown with brownish-yellow or light brown appendages.

Queens.—TL 2.4-3.1, HL 0.54-0.69, HW 0.48-0.59, SL 0.36-0.49, EL 0.10-0.16, PW 0.38-0.51, WL 0.64-0.87, SpL 0.12-0.17, PetL 0.24-0.32, PpetL 0.13-0.20mm, CI 0.86-0.93, SI 0.72-0.83, PSI 0.17-0.20. N=8

Differing from the workers in the normal queen attributes and in the following. One specimen with 3 teeth and 5 denticles; the others with the same variation as in the workers. Posterior outline of head with weak median concavity in some. Parapsidal furrows are barely discernable. Mesoscutum in all specimens longitudinally rugulose; mesoscutellum vaguely rugose to areolate-rugose.

Discussion.—Side by side comparison of the types of *foreli* and *gaigei* revealed that the only difference between them is size; but the *gaigei* type is well within the size variation of *foreli* specimens. Although the types of *huachucana* come from Arizona, far from other known *foreli* specimens, and were collected in an unusual habitat, they differ from the *foreli* holotype only in having: 1) 7-8 facets in the eyes (vs. 12), and 2) a weak metanotal groove (vs. none). Since eye size and metanotal groove development vary continuously and not concordantly in *foreli* specimens from Central and South America, and since equally small eyes and even more distinct metanotal grooves are present in those specimens, I am unable to distinguish the *huachucana* specimens as a distinct species at this time.

While working in Northern Colombia for two years I regularly collected two kinds of *foreli*, which I could distinguish at a glance by the shapes of their postpetiolar sterna (Figs. 79, 81). Specimens from Barro Colorado Island, Panama, and Trinidad also have the same two types of sterna. In Colombia and Panama, both morphs have been taken from the same locality, but it is not known whether

the two morphs come from different colonies or not. I considered calling the specimens with a more prominent, shelf-like postpetiolar sternum a new species, but the difference is sometimes subtle and individuals difficult to assign. Without corroboration from another character, I decided against erecting a new species at this time.

Rogeria foreli is closely related to *bruchi*, which at present is known only from Argentina and Paraguay, much farther south than known *foreli* specimens (see the *bruchi* description).

Distribution.—*Rogeria foreli* has a disjunct distribution: Panama and northern South America, the Caribbean, and Southwestern United States. Specimens come from 0m to 610m in Panama, 0m to 240m in Colombia and Venezuela generally from berlesate of leaf mold and rotten wood. The Arizona specimens were under stones in an oak-juniper woodland at 1783-1814m.

Material Examined.—USA: Arizona, Cochise County (R. R. Snelling). PUERTORICO: Río Piedras (J. A. Torres). ST. CROIX: Buck Island. ST. THOMAS (Eggers). TRINIDAD: (N. A. Weber). PANAMA: Barro Colorado Island (W. L. Brown, W. L. Brown and E. S. McCluskey, A. Newton, N. A. Weber, J. Zetek); Gatún (W. L. Brown); Ancon (no collector) [sting]; Gamboa (P. S. Ward); Colón Province, Frijoles (J. Ventocilla); Cerro Azul (A. Newton). COLOMBIA: no locality (Gaige); Magdalena Department, Tayrona Park (C. Kugler, P. S. Ward) [mouthparts, sting]; Tigrera (W. L. Brown and C. Kugler) [queen mouthparts, whole specimen; worker mouthparts, sting]; Guajira, Don Diego (W. L. Brown and C. Kugler). VENEZUELA: Barinas State, near Ciudad Bolívar (P. Ward); Sucre State, 32km W. Campano (S. & J. Peck). 106 workers, 17 queens, 4 males [CKC, CUIC, LACM, MCZ, MCZ, MZSP, USNM].

Rogeria bruchi Santschi Fig. 82

Rogeria bruchi Santschi 1922:352. Holotype worker, ARGENTINA, Buenos Aires, Monte Veloz (C. Bruch) [NHM] [Holotype examined].

Workers.— TL 2.2-2.6, HL 0.56-0.65, HW 0.48-0.57, SL 0.38-0.46, EL 0.04-0.06 (5-7 facets), PW 0.35-0.40, WL 0.58-0.70, SpL 0.10-0.17, PetL 0.21-0.29, PpetL 0.13-0.17mm, CI 0.61-0.70, OI 0.10-0.12, SI 0.76-0.81, PSI 0.17-0.24. N=5

The five known specimens of *bruchi* are just

like the *foreli* with nonprojecting clypeus, weak or absent metanotal groove, and nonprojecting postpetiolar sternum, but differ in the following ways: 1) Mandible with five large teeth, second to fifth subequal (Fig. 82), 2) clypeus with a median notch, 3) eyes smaller than in most *foreli*.

Material Examined.—PARAGUAY: Misiones Province, 30km S. of San Juan Bautista (F. Baud et al.); Concepción Province, 50km E. of San Lazaro (F. Baud, et al.) [mouthparts, sting]. ARGENTINA: Buenos Aires Province, Monte Veloz (C. Bruch); Misiones Province, Posadas (A. Breyer). 5 workers [MCZ, MHN, MZSP, NHM].

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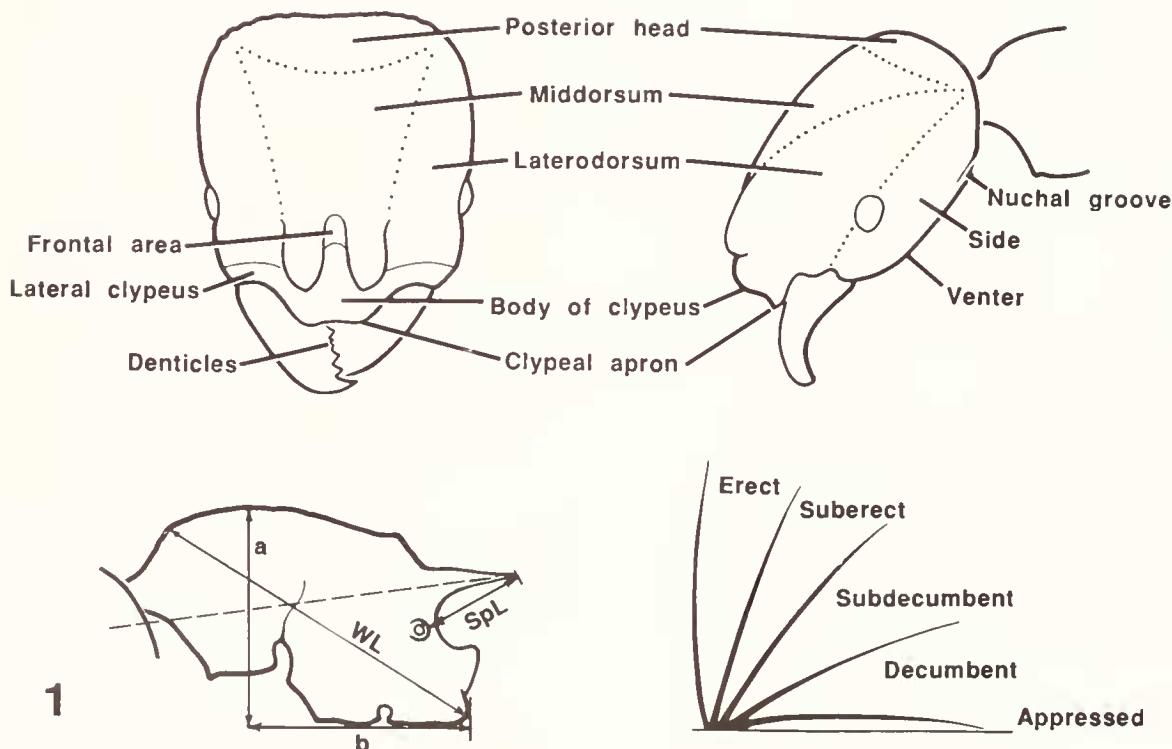
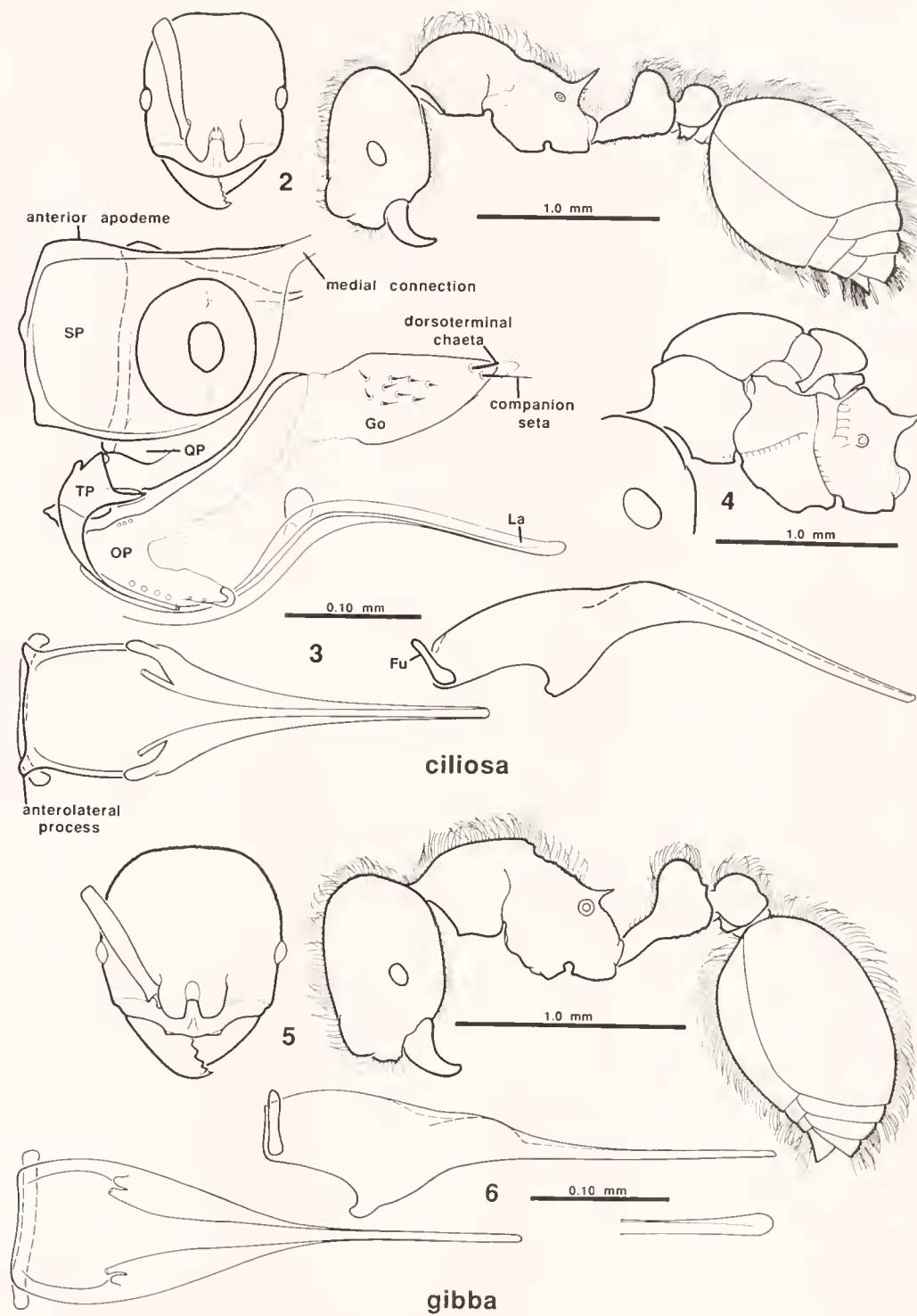
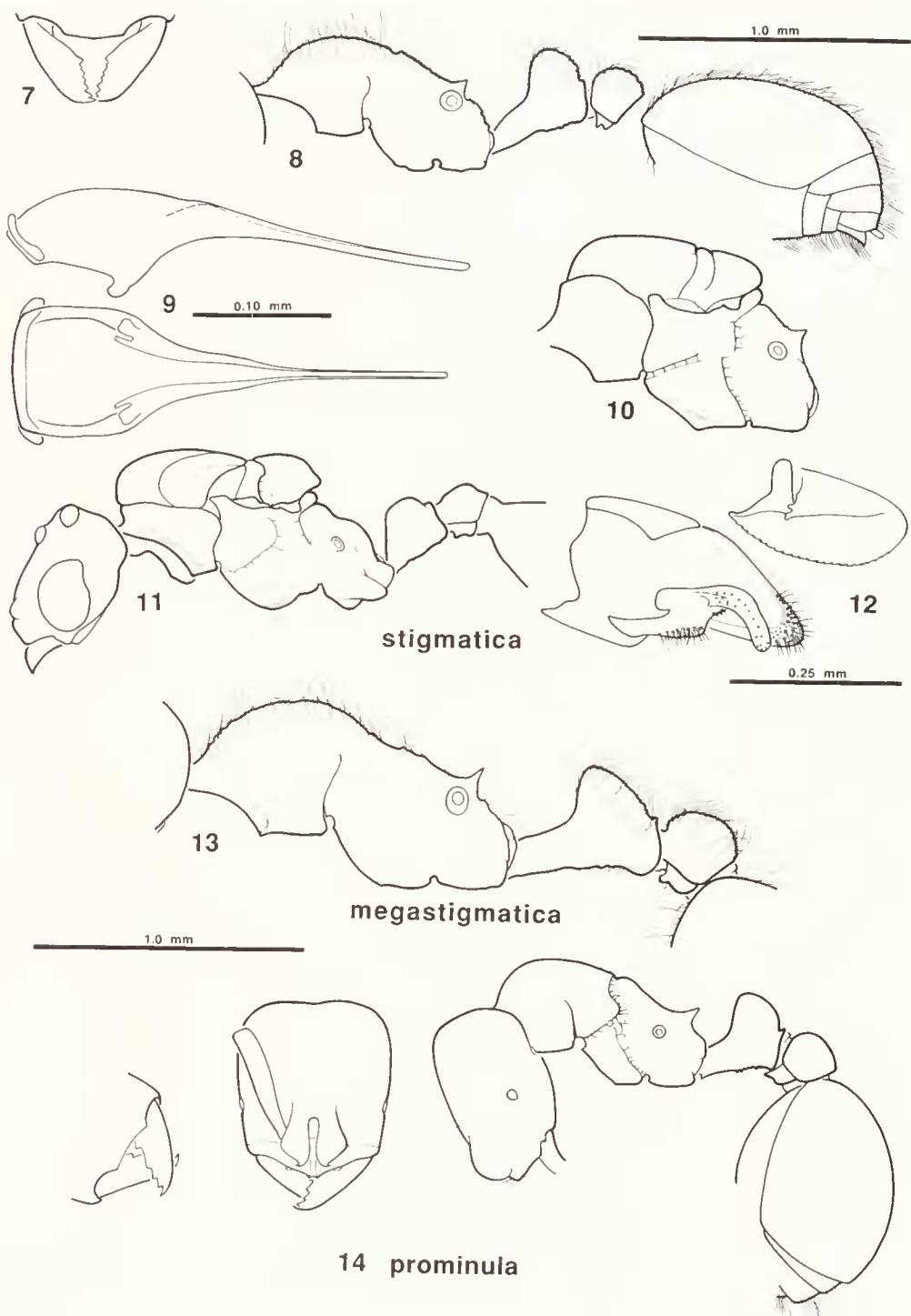


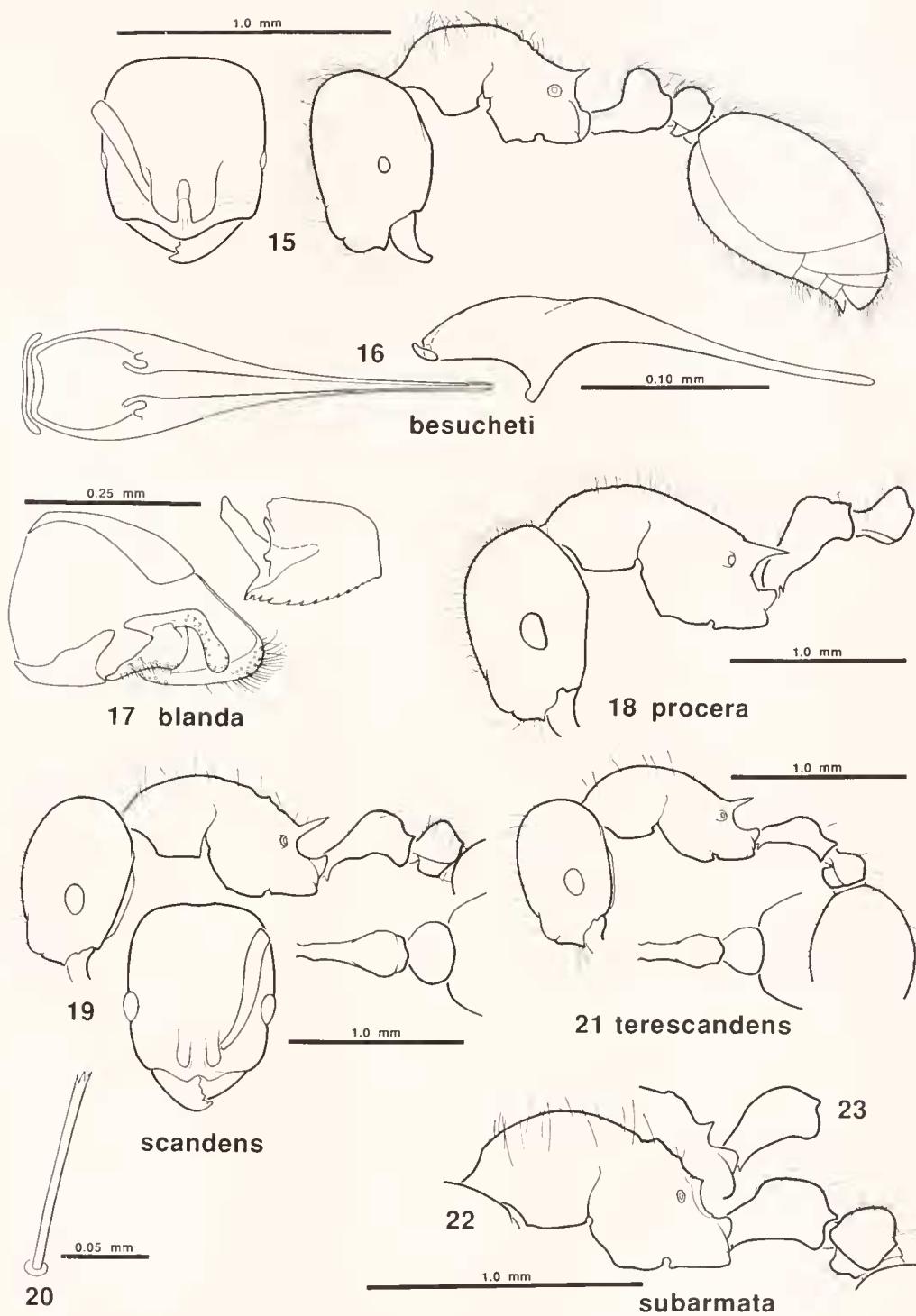
Fig. 1. Illustration of some terms and measurements used in descriptions. Dotted lines on the heads show approximate boundaries of the regions. The dashed line is an extension of a line bisecting the propodeal spines. Where it crosses the mesosoma outline gives a rough measure of spine inclination. SPL = spine length. WL = Weber's length. The mesosoma height index (MHI) is distance a (mesosoma height) divided by distance b.



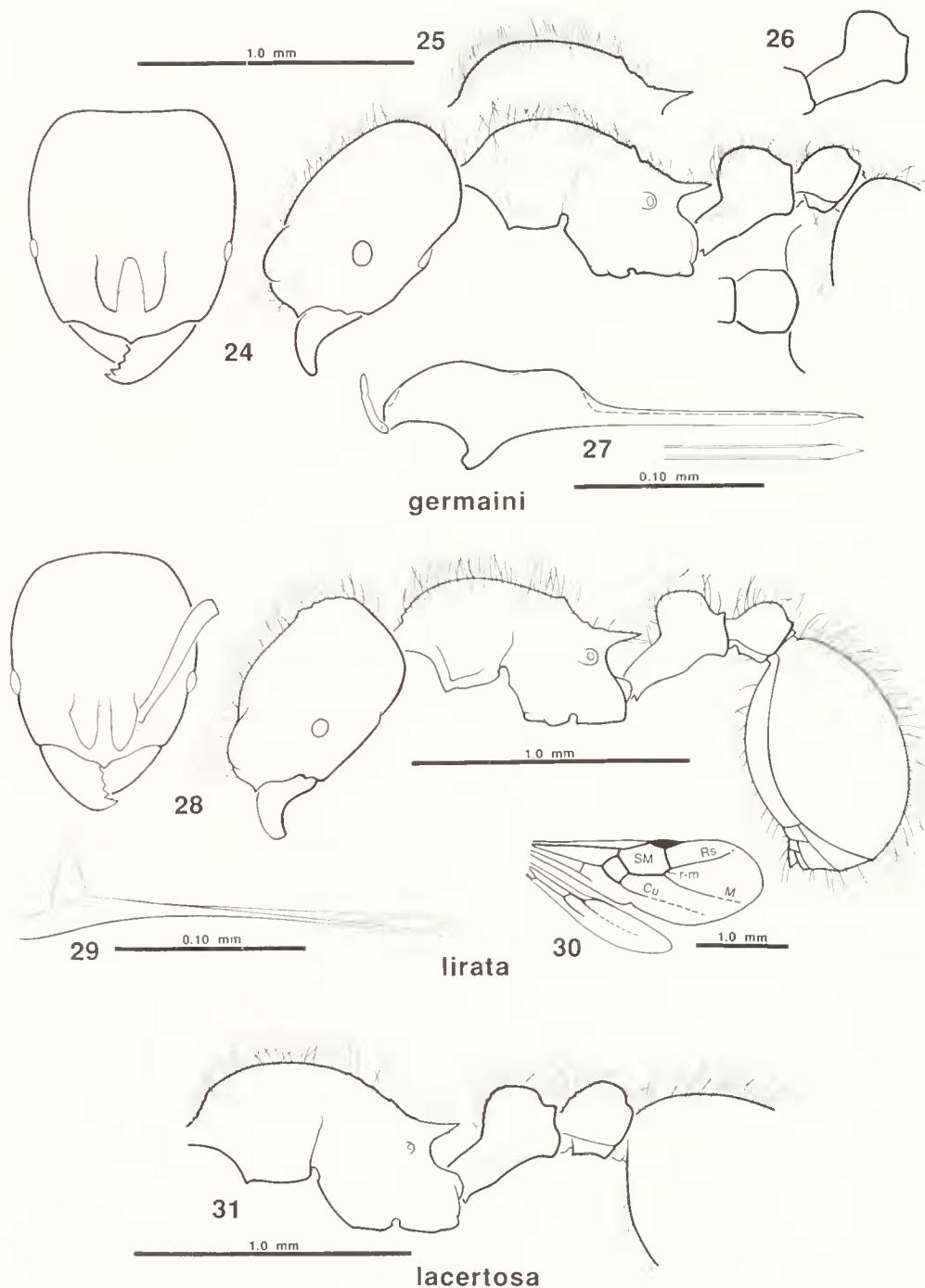
Figs. 2-6. Figs. 2-4. *Rogeria ciliosa*. 2. Holotype profile; dorsal head. 3. Paratype sting apparatus. Above: lateral views spiracular plate (SP), quadrate plate (QP), oblong plate (OP), gonostylus (Go), triangular plate (TP), and lancet (La). Below left: ventral sting, furcula. Below right: lateral sting, furcula (Fu). 4. Paratype queen lateral mesosoma. Figs. 5-6. *Rogeria gibba*. 5. Holotype profile; dorsal head. 6. Paratype sting with furcula in lateral and ventral views; lateral view of lancet apex.



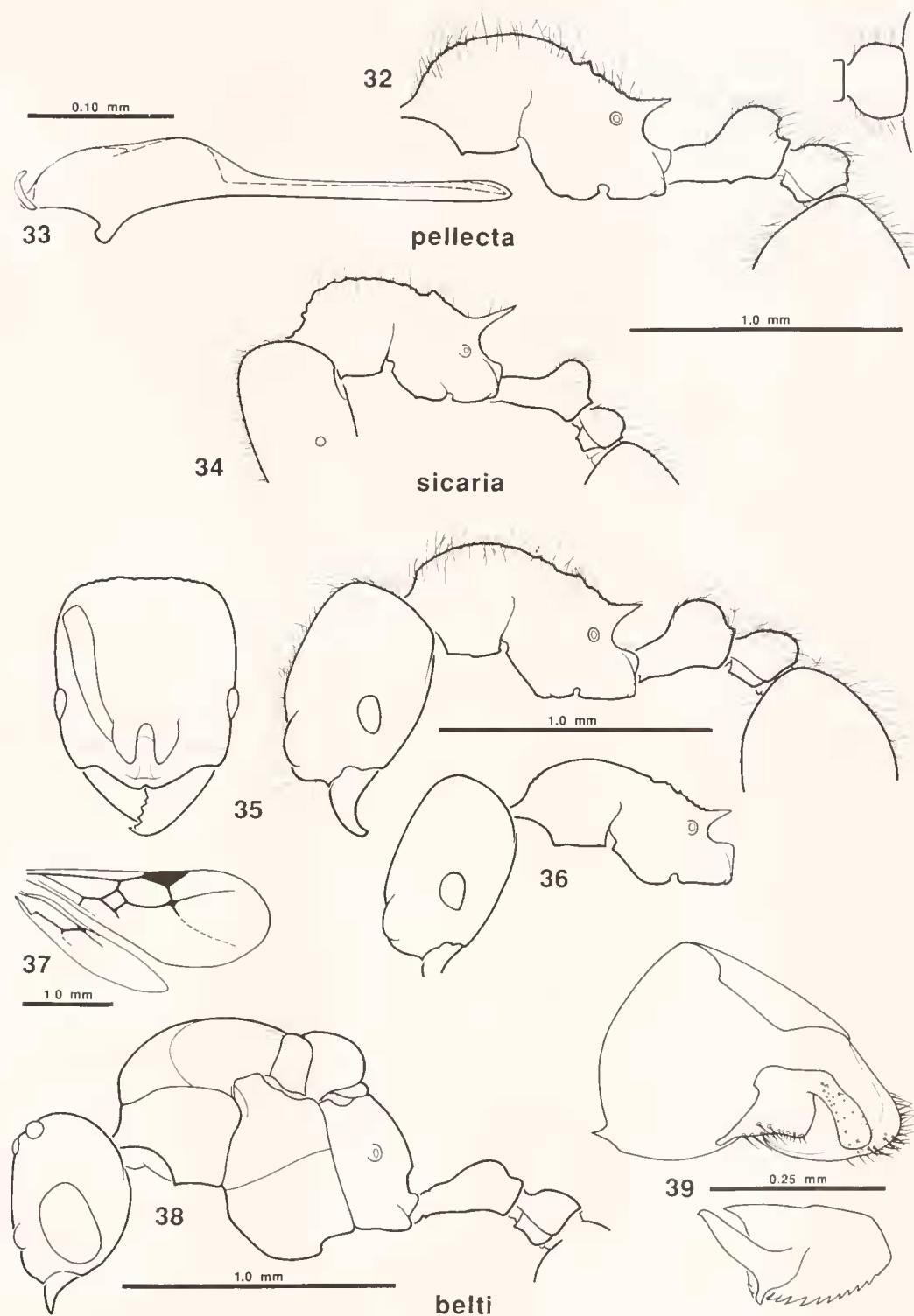
Figs. 7-14. Figs. 7-12. *Rogeria stigmatica*. 7. Syntype dorsal mandibles, clypeus. 8. Syntype profile (pilosity reconstructed by comparison with other specimens); nontype lateral gaster showing typical pilosity (Fulakora, Solomon Islands). 9. Lateral and ventral views of sting with furcula (Falepuna, Western Samoa). 10. Queen mesosoma profile (Viti Levu, Fiji). 11. Male (Sigatoka, Viti Levu). 12. Genitalia (same male). Fig. 13. *Rogeria megastigmatica* holotype profile. Fig. 14. *Rogeria prominula* holotype profile (appressed pilosity not shown); dorsolateral view mandibles and clypeal margin; dorsal head. Same scale for all external views.



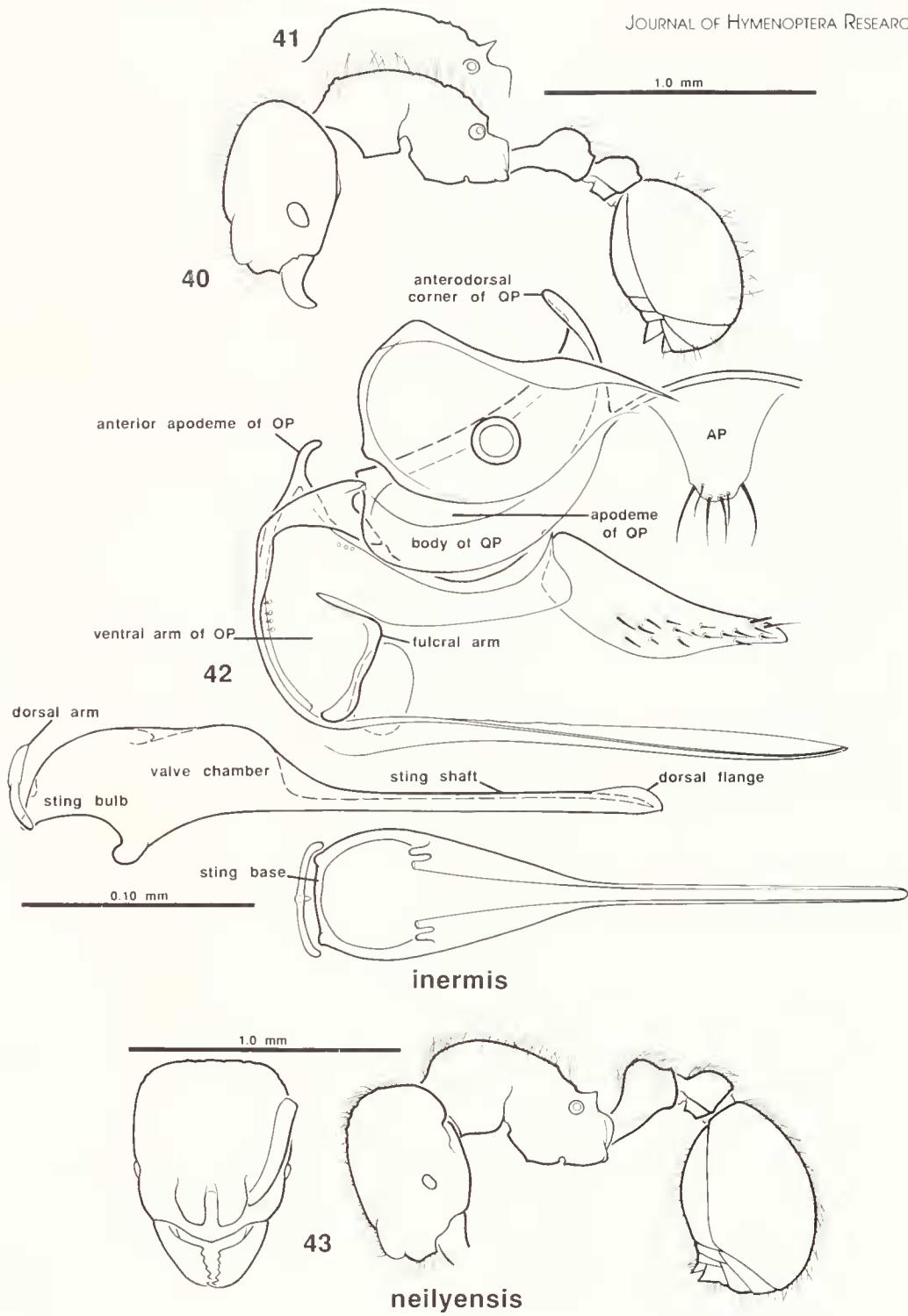
Figs. 15-23. Figs. 15-16. *Rogeria besucheti*. 15. Holotype profile; dorsal head. 16. Paratype ventral and lateral views of sting with furcula. Fig. 17. *Rogeria blanda* male genitalia (Río Akabán, Venez.). See Figs. 83-84 for worker. Fig. 18. *Rogeria procera* profile (Río Cuminá, Braz.—“brasiliensis” holotype). Figs. 19-20. *Rogeria scandens* sytype. 19. Profile; dorsal head; dorsal waist. 20. Erect hair. Fig. 21. *Rogeria terescandens* holotype profile; dorsal waist. Figs. 22-23. *Rogeria subarmata*. 22. Paratype profile. 23. Nontype lateral propodeum, petiole (Belém, Braz.).



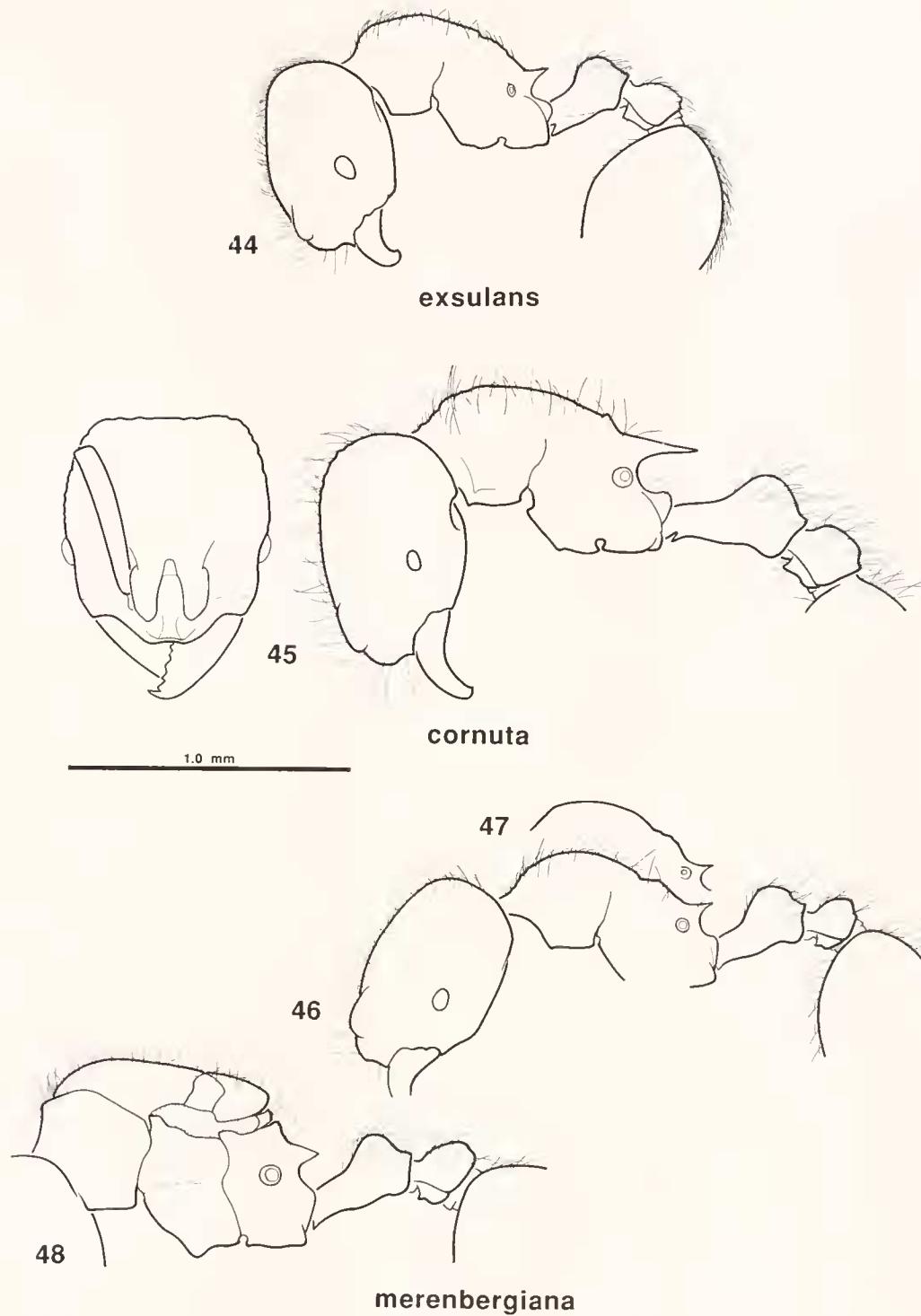
Figs. 24-31. Figs. 24-27. *Rogeria germaini*. 24. Profile (mesosoma hairs had been matted down somewhat); dorsal head; dorsal postpetiole (Passa Quattro, Brazil—"minensis" lectotype). 25. Mesosoma dorsum profile showing typical pilosity (Central Prov., Para.). 26. Lateral petiole (hair omitted) (Central Prov., Para.). 27. Lateral sting, furcula; ventral sting shaft (San Benito Is., Para.). Figs. 28-30. *Rogeria lirata*. 28. Holotype profile; dorsal head. 29. Paratype lateral lancet (nr. Yurimaguas, Peru). 30. Nontype queen wings (Jataí, Braz.). Cubital vein (Cu), median vein (M), radio-medial crossvein (r-m), radial sector vein (Rs), submarginal cell (SM). Fig. 31. *Rogeria lacertosa* paratype profile. Same scale for all external views except wings.



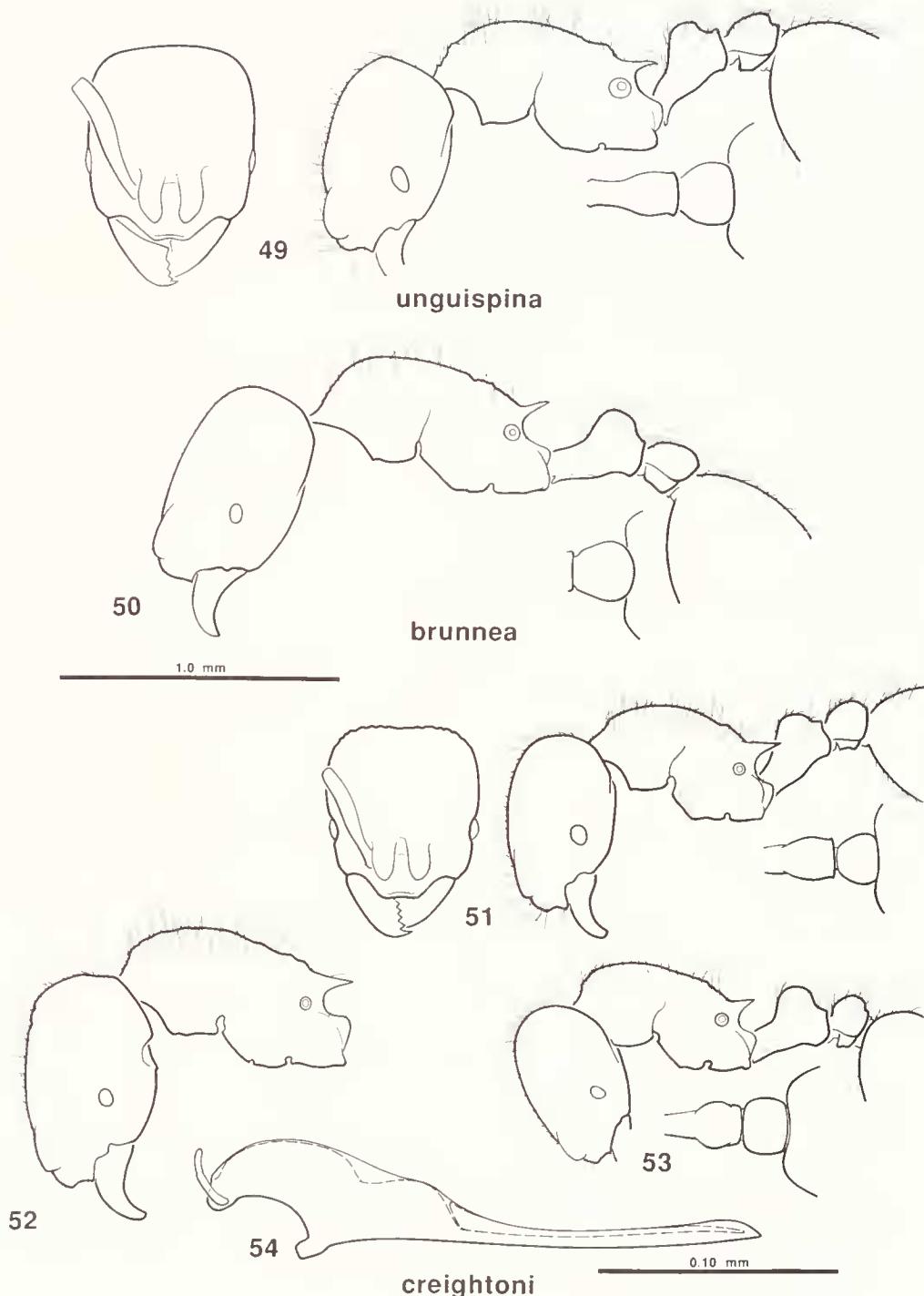
Figs. 32-39. Figs. 32-33. *Rogeria pellecta*. 32. Paratype profile; dorsal postpetiole. 33. Paratype lateral sting, furcula. Fig. 34. *Rogeria sicaria* holotype profile. Figs. 35-39. *Rogeria belti*. 35. Syntype profile; dorsal head. 36. Nontype lateral head, mesosoma (hair omitted) (Miami, C. R.). 37. Male wings (La Ceiba, Hond.). 38. Male (La Ceiba, Hond.). 39. Genitalia (same male). Same scale for all external views.



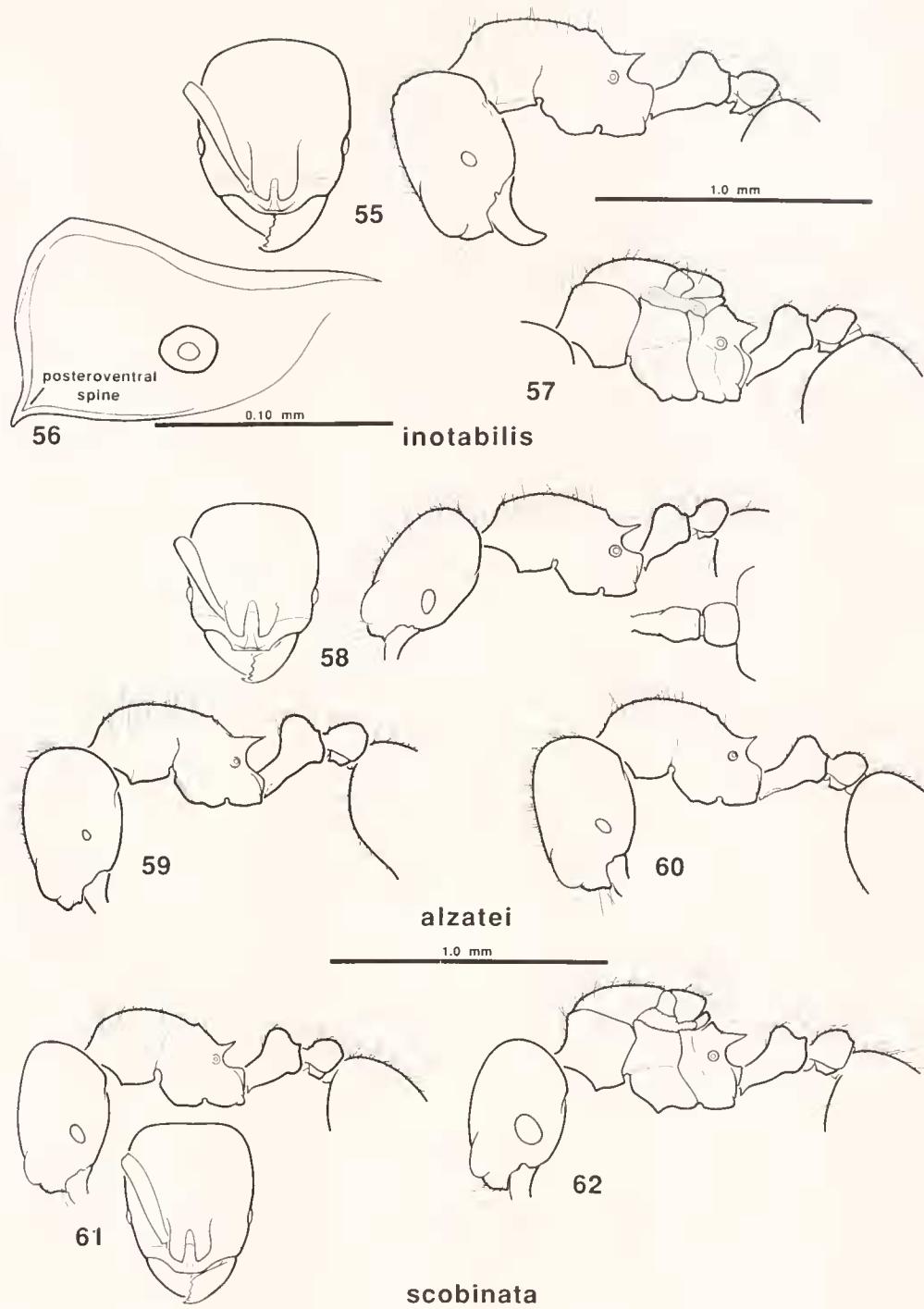
Figs. 40-43. Figs. 40-42. *Rogeria inermis*. 40. Syntype profile showing smallest propodeal spines. 41. Nontype mesosoma dorsum profile (hairs omitted) showing longest propodeal spines (Osa Penin., C. R.). 42. Sting apparatus (La Selva Station, C. R.). Right: lateral views of spiracular plate, quadrate plate (QP), oblong plate (OP), gonostylus, triangular plate and lancet; dorsal view anal plate (AP). Below: Lateral and ventral views sting, furcula. Fig. 43. *Rogeria neilyensis* holotype profile; dorsal head.



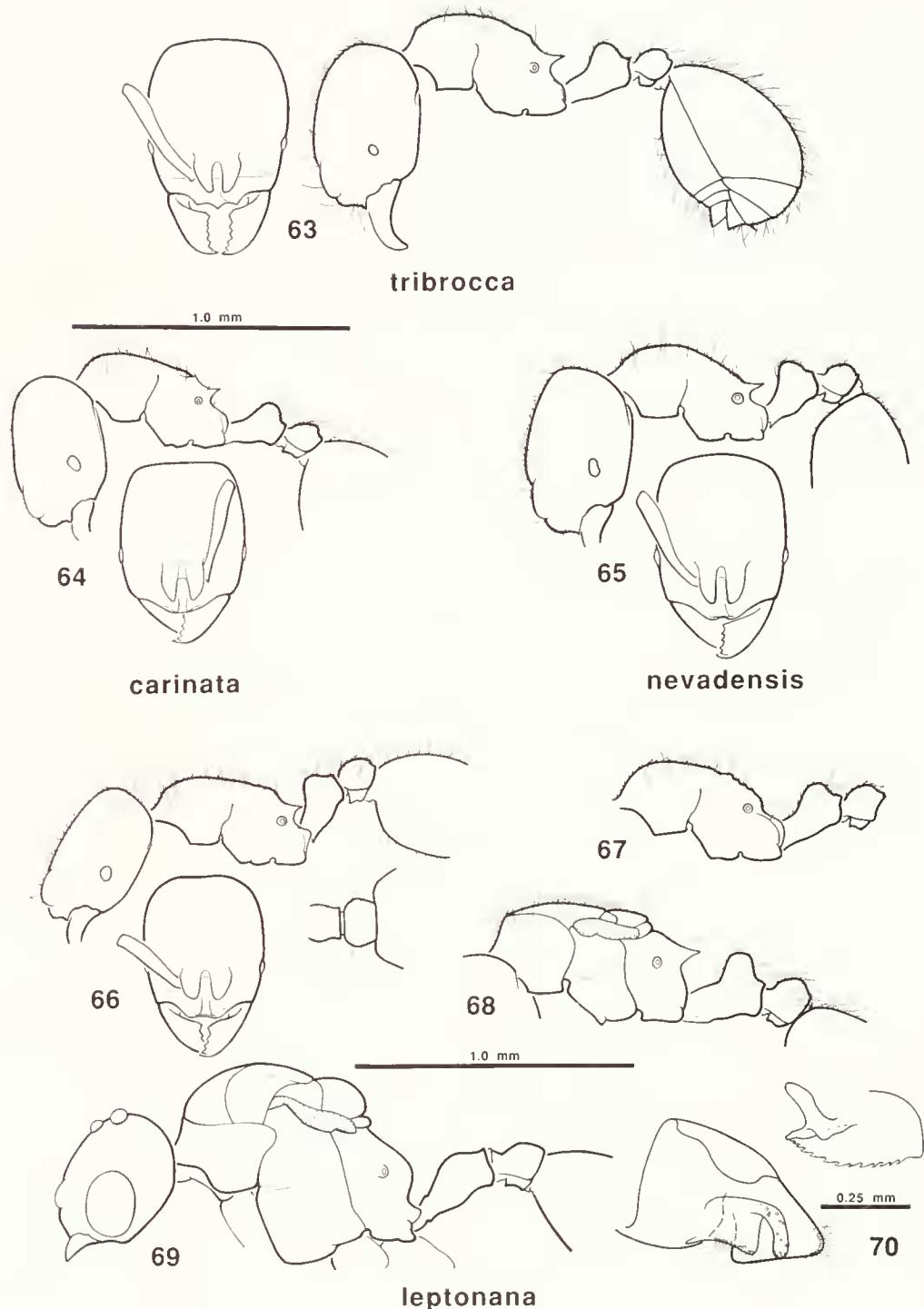
Figs. 44-48. Fig. 44. *Rogeria exsulans* holotype profile. Fig. 45. *Rogeria cornuta* holotype profile; dorsal head. Figs. 46-48. *Rogeria merenberiana*. 46. Holotype profile. 47. Nontype mesosoma dorsum profile (hair omitted) showing the least distinct metanotum (Cuevas de los Guacharos, Col.). 48. Paratype queen lateral mesosoma and waist. Same scale for all figures.



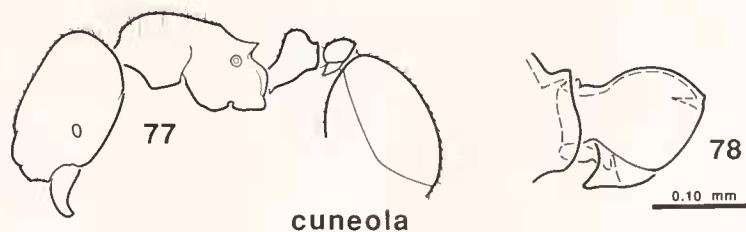
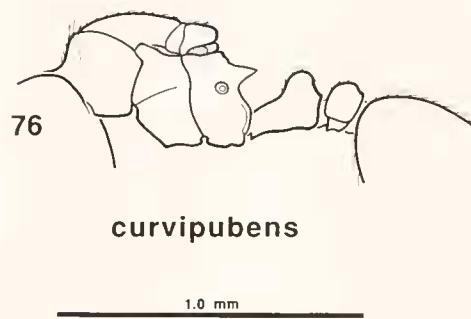
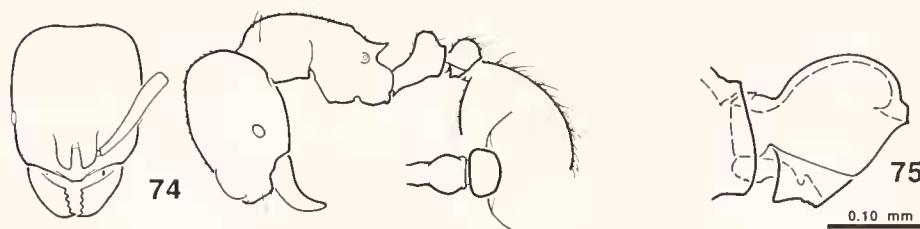
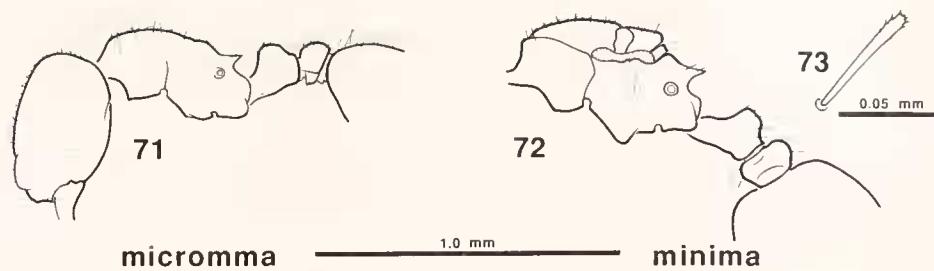
Figs. 49-54. Fig. 49. *Rogeria unguispina* holotype profile; dorsal head; dorsal waist. Fig. 50. *Rogeria brunnea* profile; dorsal postpetiole (Sierra del Rosario, Cuba—"cubensis" holotype). Figs. 51-54. *Rogeria creightoni*. 51. Paratype profile; dorsal head; dorsal waist. 52. Nontype profile (Ocozocoautla, Mex.). 53. Nontype profile; dorsal waist (Costa Rica, Nevermann leg.). 54. Lateral sting, furcula (Caves Branch, Belize). Same scale for all external views.



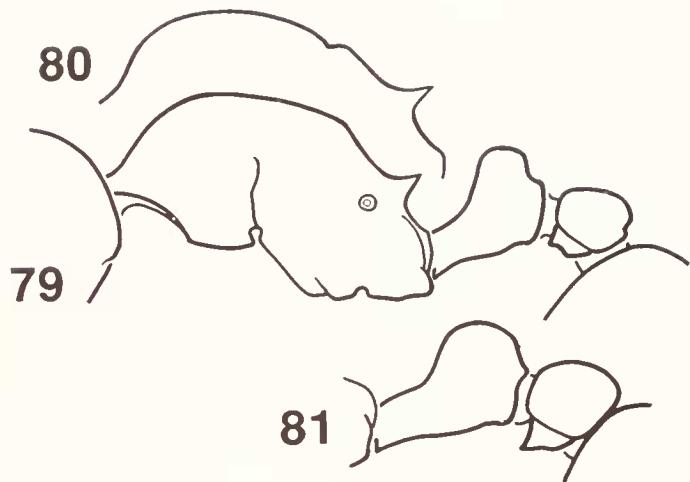
Figs. 55-62. Figs. 55-57. *Rogeria innotabilis*. 55. Holotype profile; dorsal head. 56. Paratype spiracular plate from sting apparatus (Chiapas, Mex.). 57. Nontype queen profile (Parque Tayrona, Col.). Figs. 58-60. *Rogeria alzatei*. 58. Holotype profile; dorsal head. 59. Nontype profile (Pto. Maldonado, Lake Sandoval, Peru). 60. Nontype profile (R. Don Diego, Col.). Figs. 61-62. *Rogeria scobinata*. 61. Holotype profile; dorsal head. 62. Paratype queen profile (holotype loc.). Same scale for all external views.



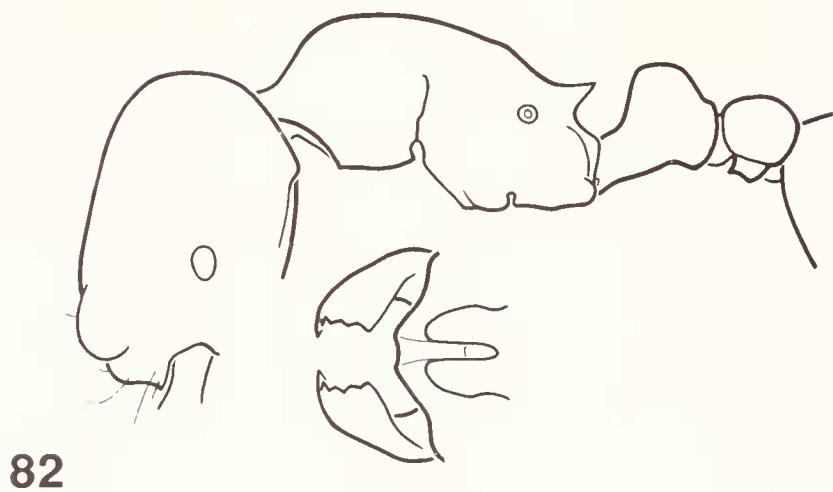
Figs. 63-70. Fig. 63. *Rogeria tribrocca* holotype profile; dorsal head. Fig. 64. *Rogeria carinata* holotype profile; dorsal head. Fig. 65. *Rogeria nevadensis* holotype profile; dorsal head. Figs. 66-70. *Rogeria leptonana*. 66. Holotype profile; dorsal postpetiole. 67. Nontype profile (nr. Nueva California, Pan.). 68. Nontype queen profile (Parque Tayrona, Col.). 69. Male (Cerro Pico Blanco, C. R.). 70. Male genitalia (same loc.). Same scale for all external views.



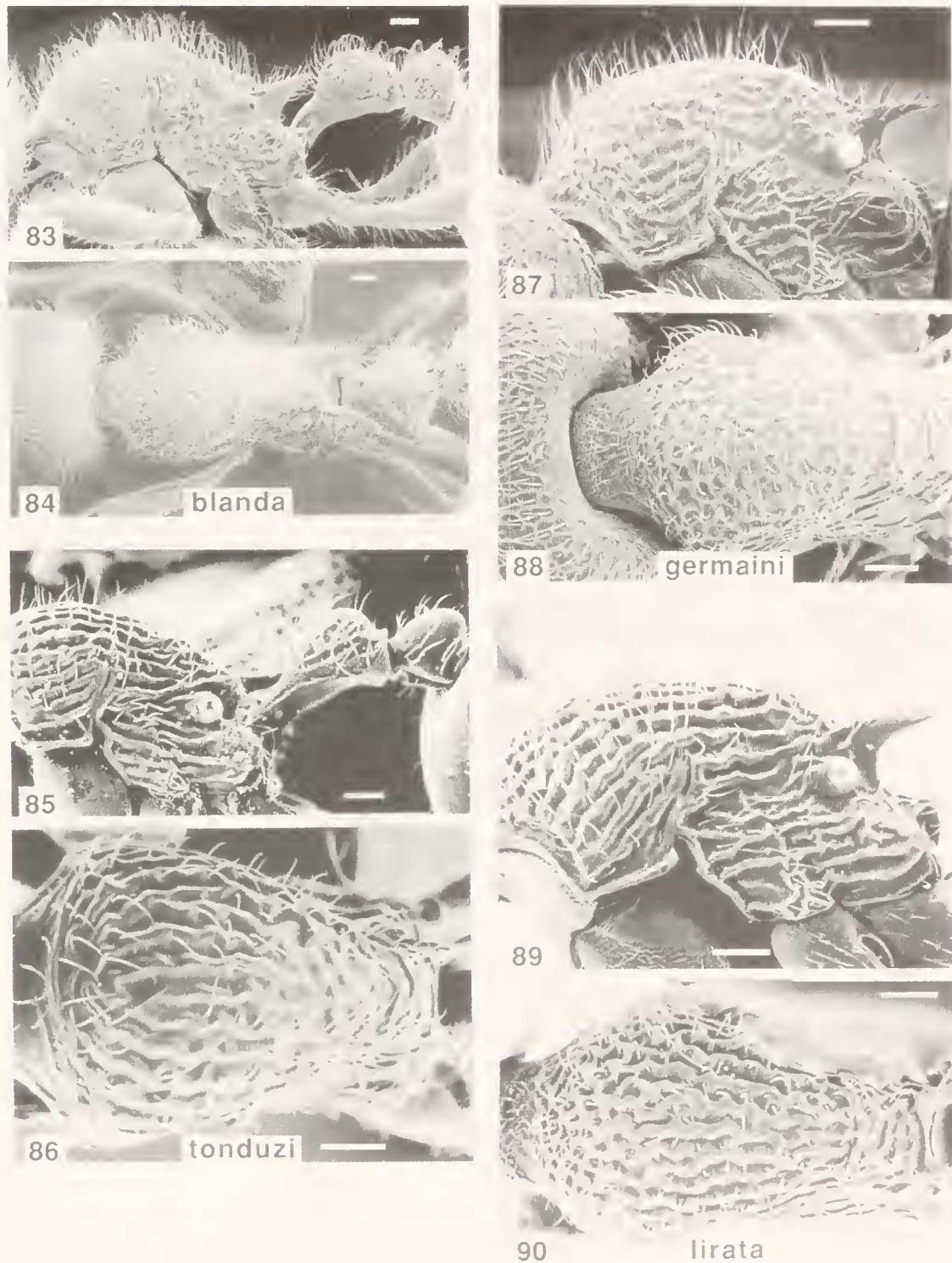
Figs. 71-78. Fig. 71. *Rogeria micromma* holotype profile. Figs. 72-73. *Rogeria minima* holotype. 72. Lateral mesosoma, petiole; ventral postpetiole, gaster. 73. Erect hair. Figs. 74-76. *Rogeria curvipubens*. 74. Nontype profile; dorsal head; dorsal waist (BCI, Pan.). 75. Slide-mounted worker lateral petiole (Parque Tayrona, Col.). 76. Queen profile (R. Don Diego, Col.). Figs. 77-78. *Rogeria cuneola*. 77. Holotype profile. 78. Slide-mounted worker lateral petiole (El Palmar, Mex.). Same scale for all figures except 73, 75, and 78.

**foreli**

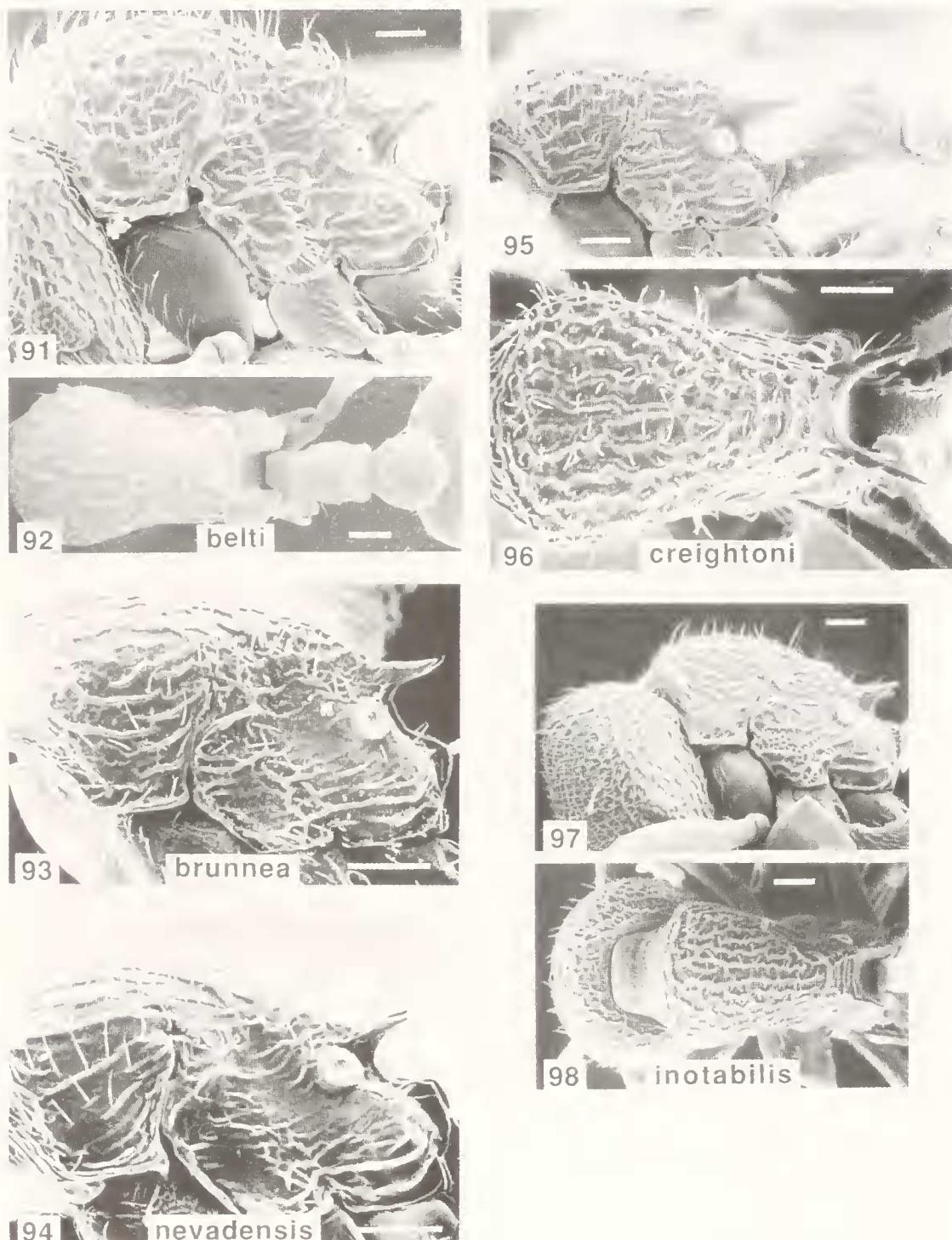
1.0 mm

**bruchi**

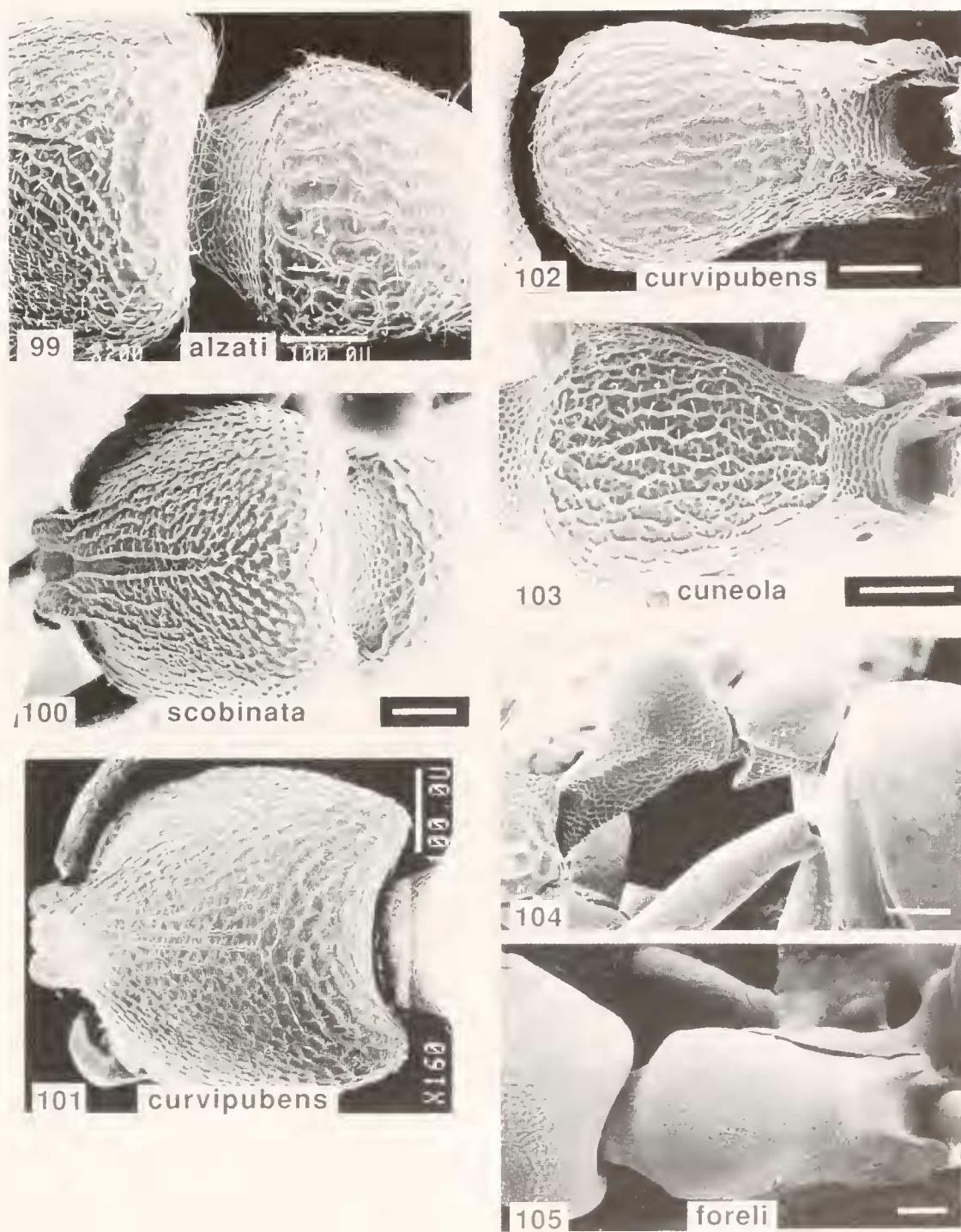
Figs. 79-82. Figs. 79-81. *Rogeria foreli*. 79. Holotype profile. 80. Nontype mesosoma dorsum profile showing strongest metanotal groove (Cerro Azul, Pan.). 81. Lateral waist (Don Diego vic., Col.). Fig. 82. *Rogeria bruchi* holotype profile; dorsal mandibles and clypeus. All to same scale.



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Figs. 91-98. Figs. 91-92. *Rogeria beltii* (nr. El Bosque, Mex.). 91. Lateral head (part), mesosoma. 92. Dorsal mesosoma and waist of a smaller worker. Fig. 93. *Rogeria brunnea* lateral mesosoma (Blanco's Woods, Soledad, Cuba). Fig. 94. *Rogeria nevadensis* paratype lateral mesosoma. Figs. 95-96. *Rogeria creightoni* (Belmopan, Belize). 95. Lateral mesosoma, petiole. 96. Dorsal mesosoma. Figs. 97-98. *Rogeria innotabilis* paratype. 97. Lateral head, mesosoma. 98. Posterior head, dorsal mesosoma. Scale lines = 0.10mm.



Figs. 99-105. Fig. 99. *Rogeria alzatei* paratype posterodorsal head, dorsal pronotum. Fig. 100. *Rogeria scobinata* paratype posterodorsal head. Figs. 101-102. *Rogeria curvipubens* (R. Don Diego vic., Col.). 101. Posterodorsal head. 102. Dorsal mesosoma. Fig. 103. *Rogeria cuneola* paratype dorsal mesosoma. Figs. 104-105. *Rogeria foreli* (Parque Tayrona, Col.). 104. Lateral waist showing prominent anterior lip of postpetiolar sternum of some specimens. 105. Posterior head, dorsal mesosoma. Scale lines = 0.10mm.